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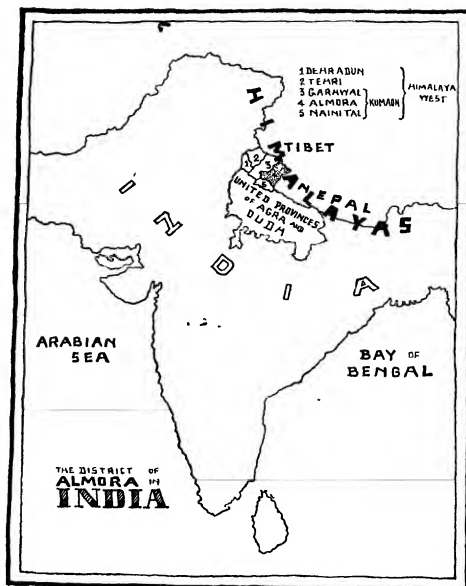
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THE SOCIAL ECONOMY OF
THE HIMALAYANS



KUMAON HIMALAYAS ON THE MAP OF INDIA

THE SOCIAL ECONOMY OF THE HIMALAYANS

*Based on a survey in
the Kumaon Himalayas*

by

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M A, LL B, PH D

Ranikhet

With a Foreword by

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Finance Member, Government of United Provinces

LONDON

GEORGE ALLEN & UNWIN LTD

MUSEUM STREET

FIRST PUBLISHED IN 1935

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PRINTED IN GREAT BRITAIN BY
UNWIN BROTHERS LTD, WOKING

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PREFACE

THE Himalayas have for many years constituted a subject of such profound and unique interest, and have attracted so distinguished a company of explorers and investigators, that it seems all but incredible that no adequate scientific account of the human geography and social economy of the Himalayans has yet been written. Nevertheless, it is a fact that, with the exception of a brief survey by Mr Traill¹ and a short account by Mr Pauw,² no serious investigation and treatment of this important and interesting subject has hitherto been attempted. It was with a view to filling this important lacuna in our knowledge of the Himalayans that the present study was undertaken some years ago. It represents the result of a first-hand inquiry, extending over a period of nearly five years, into the different aspects of the socio-economic life of the Himalayans. A preliminary account was presented and approved as a thesis for the Degree of Master of Arts of Lucknow University in 1928.

During the last four years, however, I have been enabled to continue my investigations unhampered by the demands of the University time-table, and it is now possible for me to present a fairly adequate account of the more prominent aspects of the social and economic life of the people inhabiting the region known as the "Kumaon Himalayas."

The common adage, "Necessity is the mother of invention," is nowhere better illustrated than in the economic life of the Himalayan people. The tremendous difficulties of the environment have not, as might be imagined, been able to suppress the initiative and the energy of man. On the other hand, they have provoked a high degree

¹ Mr G. W. Traill was the second Commissioner and first Settlement Officer of Kumaon (1815-35) after its occupation by the British in 1815, and made the first "guess settlement" in 1823. His book, the *Statistical Sketch of Kumaon* (written 1820) is the first original work on Kumaon, and contains some one hundred pages (demy 8vo). He was a great climber, who crossed the Pindari Glacier and reached Lwan (19,000 feet), perhaps the loftiest habitation in the world.

² Mr E. K. Pauw conducted the tenth settlement in Garhwal (1892-5). His report on this settlement is by far the best account of Garhwal and touches almost every aspect of the hillman's life. It was published in 1895. Both this report, as well as the account by Mr Traill, are now out of print.

of adaptive skill and uncommon physical vigour. The picturesque terraces of the Himalayan slopes that greet the eyes of the traveller represent an extraordinary degree of strenuous toil and resourcefulness, such as have been surpassed in few regions of the world.

Again, where man has been unable to conquer the hostile forces of Nature, he resorts to migration, so that a seasonal nomadism is one of the characteristic features of economic adaptation in this region. I may instance the summer and winter migrations of the Bhotiyas to the high mountains and the low valleys, the summer migrations of the graziers from the Almora region to the higher altitudes, and the winter migrations of the Sub-Himalayan people to the still lower regions of the Bhabars.

This seasonal alternation between the semi-nomadic pastoral life on the one hand and the settled agricultural life on the other, has left an indelible stamp upon the social and economic habits, and even the institutions, of the people. Indeed, the different responses of people in different levels of the mountain section are most vividly revealed by an intensive survey and comparative study, region by region, of the methods of cultivation, pastoral industries, and methods of trade and transport. Nor is this peculiar to the Himalayas alone. Both in the Pyrenees and the Andes, for instance, we have seasonal migrations accompanied by alternations of occupation. In winter, when the snow makes agriculture absolutely impossible, the highland dweller becomes a nomad in the lower valley, while the inhabitants of the lower valley move farther down to the foot of the mountains, partly in search of a better climate, partly in quest of more abundant pasturage, and partly also to sell and exchange commodities. In the summer a contrary movement sets in, when the people of the lower valley send up their herds of cattle to the rich pastures of the higher altitudes.

Life in the Himalayas, whether it be herding in the pastures or working in the fields, is full of back-breaking tasks, dreary monotony, and unforeseen accidents. Such conditions are mitigated by the development of a community life of mutual aid and kindness in labour, leisure, and recreation. Thus, among the semi-nomad Bhotiyas we find all the women of the village gathered together in a hilarious company and weaving in the warm sunshine, while village clubs are also common, and the young men and women indulge in singing,

dancing, and love-making more freely than is customary in the plains. The rice-growing communities in the irrigated valleys exhibit a similar neighbourliness in their work and amusements. The system of mutual exchange of labour and cattle-power during the different stages of cultivation, and the participation of the women of different households, together with hired hands, in the tedious task of transplanting rice, are other instances, reminiscent of the plains, of social and economic co-operation.

The structure and character of the Himalayan's home has also been largely determined by the physical environment. Thus, while among the Bhotiyas habits of nomadism have led to the development of a sturdy and independent womanhood, which produces sensible wives and competent mothers, among the hillmen, on the contrary, a narrow and bigoted conservatism has degraded women to the position of a miserable drudge. Nor should we omit to notice the striking contrast between the full and free participation of the Bhotiya woman on equal terms with their menfolk, in work and play, and in social intercourse generally, and the total exclusion of the Sub-Himalayan woman from a share in all those activities that lend a variety and charm to life and make it worth living and striving for.

Again, the environment is so dominant here that it has left an impress even on the religious ceremonies and festivals and pastimes of the Himalayans. Nature here is awful, impressive, and overpowering, and the hillman must always bow before it in humility and reverence. Every season has its own appropriate festival, the ceremonies in each being largely influenced by the climatic needs or other characteristics of the particular season. Thus, the arrival of the winter is heralded by the "Feast of the Bonfires" and of the summer by the "Festival of the Flowers." As the whole appearance of the mountain landscape changes with the march of the seasons, so is there a similar transformation in the activities, interests, and rituals of man.

This brief survey of the socio-economic life of the Himalayan should make it clear that a scientific account of his social and economic habits and institutions must be full of interest and instruction to the student of social economics. It is with the faithful presentation of the sociological and economic data of his life, and the drawing of ten-

tative conclusions therefrom, that this book has been mainly concerned

I must acknowledge my deep obligation to Dr Radhakamal Mukerjee, M A , Ph D , Professor and Head of the Department of Economics and Sociology in the Lucknow University, for the kind encouragement received by me at his hands

I wish to express my thankfulness to my teacher and friend, Dr H L Dey, M A , D Sc , for so patiently going through the whole MS and for advice and criticism which have been helpful in improving the argument at many points

Nor must I omit to express my deep indebtedness to Rai Pt Lakshmi Dat Pandey Bahadur, Advocate, for his very valuable suggestions and for so thoroughly checking the proofs

I also thank Pt Krishna Nand Shastri, B A , L T Muafidar, Almora, and Mr Ram Lal Sah, of the Government Orchard, Chaulbattia, for their very kind assistance

S D P

UNIVERSITY OF LUCKNOW

April 1932

FOREWORD

IN his preface, the author tells us that this book has developed out of a thesis which he presented in 1928 for the M A degree of the Lucknow University. I saw that thesis, and I remember thinking that it deserved presentation to a larger public than such theses usually obtain. Since then Mr Pant has spent four years in increasing his material, in checking his old inquiries, and in making new. The result is a book as full of interest as it is of information. And my pleasure in writing this foreword to it is all the more greater, that I had already studied the thesis from which it sprang.

There are few,—whether private persons or officers of Government,—who possess intimate knowledge of the Kumaon Hills, and of those few, only some have ever put their knowledge on paper. In his bibliography, Mr Pant mentions by name forty-one authors whose works he has consulted, but of these only fourteen are true “Kumaonis”—men who have lived in and worked for Kumaon. Any addition to the bibliography of Kumaon therefore is welcome,—especially a book of this kind, with its wealth of detailed information. And, indeed, Kumaon is perhaps the most interesting tract in the United Provinces. Its people, its social system, its customs, its methods of agriculture, even its language differ as greatly as its climate from those of the plains. Advance but a mile or two from the foothills into the Himalayas, and you will quickly realize that you are not only in a different country, but in the midst of a different people and a different civilization,—an older and simpler civilization, but all the more attractive, and not necessarily the worse, for its age and simplicity. Mr Pant, himself a Kumaoni, is well fitted to write of Kumaon. And there are other aspects of Kumaon to which he might, in future, profitably turn his attention. Meantime, I wish success to this book, which will certainly prove of service to those who (like myself) know less of Kumaon than they should, and of interest to all who study economic questions.

E A H BLUNT

January 31, 1935

GLOSSARY

- Adya*—Burning shrub and bushes
Agari—A depressed class, sub-caste of miners and ore-smelters.
Ajota—Non-ploughing day
Aliswalo binar—Paddy nursery with furrows
Alsi—Flax
Amlugura—Homespun woollen cloth tied to the bier
Asans—Small woollen carpets
Atmeen—Dry mud embankment
Aya—Deep furrows

Badhan—Tutelary god of cattle
Bag-bakari—Game similar to "Fox and Geese"
Bagwal—Sport of hurling stones
Baira—Ballads
Bagelas—Bamboo weavers
Bayyu—Hymns
Bakus—Gowns of menfolk in Bhot
Baniya—Money-lender and shopkeeper
Banj—Oak (*Quercus incana*)
Banjara—Plain muleteer
Bansuli—Shepherd's pipe
Barath—Giant sickle
Basant Panchami—Festival in honour of the Spring
Basmati—Superior variety rice
Bhabar—Waterless and boulder country at the foot of the hills.
Bhabarias—Migrants to the Bhabars
Bhagnolas—Duets
Bhanga—Hemp
Bhangela—Hempen cloth.
Bhat—Soy bean (*Glycine soja*)
Bheli—Cake of coarse sugar ✓
Bheloji Bhelo—Shouts uttered while kindling the bonfire
Bhon—Feeding cattle in the fields
Bhot—North-eastern part of the Almora district adjoining Tibet
Bhotiyas—Men living in the north of the district adjoining Tibet
Bhumtayan—Tutelary god of fields and boundaries
Bhyuni—A plant (*Grewia oppositifolia*)
Bugyal—Highest summer pastures.
Buna—Weeding by hand
Byansi—Resident of Byans

Byol pitar—Bamboo-box used for conveying the ornaments, etc., of the bride from the bridegroom's house.

Byun—Flocks of ewes kept for breeding

Chakhuli-makhuli—Rustic love-songs

Chal Basant—Local rainstorms of a passing nature during summer months

Chamfuti—Folk dance of Johari tenants

Chamu—Tutelary god of cattle

Chanchari—Ring dance of Danpur

Chans—Primitive looms

Charan—A system of threshing

Charas—Resinous exudation of hemp

Chatoyi—Belonging to Chait, the first month of the Hindu calendar

Chaiyur—Leaf umbrella

Chaumas—Rainy season

Chaumasiya-kheti—Autumn crop

Chinka—Single-cable bridge

Chomolungma—Goddess mother of Mount Everest

Chota barsat—Preliminary rains

Chua—*Amaranthus frumentaceus*

Chunta—Coarse and inferior blanket

Chura—*Bassia butyracea*

Chutka—Coarse woollen rug

Coolie—A porter

Cröre—Ten millions

Dabala—Threshing club

Dahar—Tenth day

Dailar—Clod-crusher, like a polo-stick.

Dain—Threshing wheat with teams of bullocks

Dala—Basin-shaped bamboo basket.

Dalbadal—A variety of rice

Damaru—Drum of the God Mahadev

Dandyala—Ring dance with sticks

Dandyala—

Dhurang—

Dhuska—

} Types of folk dances

Dans—Pile carpet

Danyala—Harrow

Darmi—Resident of Darma

Daru—Wine

Datula—Sickle

Dhakarias—Drovers

Dhan—Paddy

Dhankuttas—Those who thresh paddy for Tharus.

Dharmua—Rain god

Dhaun—A weed resembling the rice-plant

Dhur—Hill-top.

Dimjo—Hybrid of a yak bull and a *jibu* cow

Doka—Bell-shaped basket

Doms—Depressed-class people

Dotiyal—Man of Doti (Nepal), a porter

Finchi—Fine luscious grass of the summer pastures.

Functa—Hand-basket

Gabla—Rain god

Gadheras—Glen, ravine with water

Gajaiya—A variety of paddy

Ganara—*Panicum miliaceum*

Ganoni—Ceremony after harvesting

Gar—Glen, ravine with water

Garjo—Cross between a hill bull and a yak cow

Ghamtappas—"Eaters of sunshine," poor class of temporary migrants to the Bhabars

Ghami—Handmill.

Ghanimaya—Toothed harrow

Ghat—Watermill

Ghdi—Place at which a stream is forded

Ghi—Clarified butter

Ghingaru—A wild thorny bush (*Cristaegus crenulata*)

Ghira—Bell-shaped basket

Ghughutia—Festival of feasting birds and children

Ghungutia—A type of temporary cattle-shed erected by the graziers

Ghusghusi—Glissade

Gwain—Bumper wheat crop

Gohat—Horse gram (*Dolichos biflorus*)

Goth—Lower story of the cultivator's dwelling where cattle are kept

Guls—Small water-channels.

Gur—Coarse sugar (molasses)

Gwar—Separate cattle-shed.

Hal—Plough

Haldi—Turmeric

Haluya—Ploughman

Hambaghar—Nomad club house

Hammal—Necklace of coins.

Hansraj—A superior variety of rice

Har—Name of the God Mahadev

Hardyul—Rain god

Harkali—Wife of the God Mahadev

Haryala—Festival of rains

Hatol—Minute irrigation-channels

Himal—Himalayas

Hisalu—Wild raspberry

Hunidhan—*K'agi*

Huniya-kheti—Spring crop

Huniyas—Tibetans

Hurka—Drum

Hurkiya—Drummer

Hurkiya bol—Singing entertainment while transplanting is in progress

Huwain—Snowfall

Hyun—Winter

Iyran—Intermittent terraced cultivation

Jaithras—The tenant class among the Bhotiyas

Jambu—A scented grass

Jata—Matted locks

Jainla—Twin

Jhakaro—Bough of a tree

Jhangora—*Oplismenus frumentaceus*

Jhula—A kind of bridge

Jibu—Cross between a hill cow and a yak bull

Johari—Resident of Johar

Joshi—Village astrologer

Jungpun—Tibetan district officer

Jwam—Hybrid of a hill bull and *jibu* cow

Kahan—Millets and pulses

Kair—Firing the shrubs and bushes

Kakar—Barking deer (*Cervulus aureus*)

Kalain—Ceremony immediately before harvesting

Kale Kale—Shouts by children while calling crows

Kalipariya—Nepakse, people living beyond the Kali

Kamila—Highly valuable soft black woollen wrappers used by the women
in Johar

Kangali Bihu—A festival of Assam

Kangima—Goddess mother of Kangchenjungpha

Kankai—Y-shaped stick

Kanthi—Inferior

Kanyala—Shoulder ropes of a Himalayan porter

- Kanyuras*—Paddy stacks
Karboza—Saddle-bag for a goat or a sheep.
Kathburiya—Wayside goddess
Katwa—Hand-spindle
Katyuri—Belonging to Katyur
Kauni—*Panicum Italicum*
Khagi—A method of growing rice
Khal—Oil cake
Khdl—Pond
Khambas—Tibetans
Kharak-badhan—System of manuring fields by tying cattle in them at night
Kharaks—Temporary sheds of herd boys
Khari—A haversack
Kharif—Autumn crop
Khas—Giant storage boxes of half-ton capacity
Kharsu—Species of oak
Khata—Plot of land in the forest assigned for pasture
Kheda—Hunting
Khenta (rangbangka)—Son born out of wedlock
Khenti (rangbangka)—Daughter born out of wedlock
Khil, katil, Kalabanyar, kandala—Intermittent cultivation in virgin soil
Khyo—Ceremony of first sowing
Kiaris—Small beds made for irrigation
Kilmora—Berberry (wild)
Kisar—Shifting pegs
Kilta—Bell-shaped basket
Kirmuli—A variety of rice
Koli—One who presses oil
Kon—Paddy husk
Kotu—Buckwheat
Kshetrapal—Tutelary god of fields
Kuls—Small irrigation-ditches
Kumhar—Potter class
Kungr—Rain god
Kuthaliyas—Those engaged in manufacturing *kuthlas*
Kuthla—Hempen cloth bags
Kutla—Hoe
Kwara-khagi—System of rice culture

Lakh—100 thousands.
Lama—Tibetan *khamba*
Langars—Groups of cattle
Langoor—*Presbytis schistaceous*

Lathi—Huge wooden club

Lha Thal—A Tibetan tax

Lum—Woollen shoe

Luta—Hay-stack

Madua—*Eleusine coracana*

Mahadev—One of the gods of the Hindu Trinity.

Makar—Sign of Capricorn

Mal—Plains, Bhabars

Malu—*Viburnum continifolium*

Mantrum—Sacred hymn

Margsir—9th Hindu month

Marwaris—Rich trading class in India

Matta—T-stick

Maya—Lyceller or toothless harrow

Meen—Plastered embankments

Mela—Periodical fair

Minolas—Mud embankments

Mitakhara—Law of inheritance among Hindus

Mitra—Tibetan trade correspondent

Miyula—Goddess mother of Panchachuli Peak

Mohat—Mat

Mosta—Mat

Muksar—Set of fields lying fallow

Muth—A variety of red rice

Nalai—Uprooting weeds with the hands.

Nali—240 square yards, or 4 lb

Nanda—Goddess mother of Nanda Devi

Nandhani—A superior variety of rice.

Naphal—Himalayan wheat

Nawain—Ceremony when new corn is first cooked

Naya—Winter residence in Kali-Kumaon

Nishan—Banner

Ogal—Buckwheat

Oliya Gusain—Medicine man and rain maker

Pahar—Self-grown rice

Pahari—Hilly

Paura—Threshing paddy with teams of bullocks

Palgarno—Scratching the surface.

GLOSSARY

21

Palla, or *Pharka*—Temporary movable cattle-shed in Salts

Palta—System of exchange

Palti—Buckwheat

Paltiyars—Workers on exchange

Panchar—Temporary irrigable land

Pankhis—Coarse woollen wrappers

Parai—V-shaped stick

Pargain—A red variety of rice

Pargana—Principal nominal division of the district

Patti—Principal nominal division of a pargana

Patti binor—Compact paddy nursery

Pattu—Coarse serge

Payar—Highest pastures

Penh—Weekly or semi-weekly market day in the Bhabars

Phaphar—Buckwheat

Phooldeys—Festival of flowers

Phulwa—Oil pressed from *Bassia butyracea* fruits

Pice—a copper

Pitar—Bamboo box

Pithya—Red powder

Pola—Cake of coarse sugar

Ponda—Thick variety of sugar-cane

Purdah—Screen, custom of keeping women in seclusion

Pushm—Very warm soft underhair of the Tibetan goats

Putisar—Act of actual transplanting

Rabi—Spring crop

Rai—*Brassica juncea*

Rajis—Forest tribe

Rangbangkuri—Nomad clubs in Darma

Rans—*Dolichos sinensis*

Ranth—Common weaving courtyard in Darma

Rasa Garba—Folk dance of Gujarat

Ringal—Hill bamboo

Riyanth—A pair of sticks for reaping

Ropa, Ropai—System of transplanting rice

Runiya—Shepherd god

Ruri—Hot weather

Rwain Chawain—Game of roundabout

Sagrya—For vegetables

Sain—Shepherd god

Sajhis—Bhabar tenants

Sal—Superior variety of rice

Sal—*Shorea robusta*

Sambhar—*Rusa aristotelis*

Sanga—A kind of crude bridge

Sangam—Confluence

Sanidanyala—Harrowing rake

Sar—Set of fields for rotation

Sarji—Envoy who levies tax on behalf of the Tibetan Government.

Saryatha—Two small sticks for reaping

Sattu—Envoy who opens the Tibetan passes

Satu—Sweet or fried flour

Saya—System of paddy sowing

Saylo—Shady

Seras—First-class irrigated lands

Shas—A kind of food

Shakti—Goddess of Power

Shankranti—First day of every Hindu month

Shimar—Water-logged land

Shisham—*Dalbergia Sissoo*

Shiva—Mahadev, or the God of the Mountains

Shradh—Ceremony in honour of the departed spirits of dead relatives

Sidhuwa Bidhuwa—Shepherd gods looking after sick flocks

Sirgrohs—Bhabar Headmen

Stridhan—Property owned by a female under Hindu law of which she can dispose as she pleases

Suljimsulj—Tea- or wine-drinking ceremony among Bhotiya traders

Sulyatha—Wooden pole with rope for carrying grass

Supas—Winnowing-scoops

Sutar—Leaf litter

Tailo—Sunny side

Takli—Hand-spindle

Talaon—Irrigated and cultivated lowlands

Talliya—Alluvial but unirrigated land

Tambu—Tent

Tap Thal—Tibetan hearth tax

Tar—System of threshing

Tarai—Marshy malarious country immediately below the Bhabars

Tarkeb—Cloth used as a tent

Tasla—Basin-shaped iron pan

Tharus—Original residents of Tarai—a forest tribe

Thulma—Thick woollen blanket

Tilonj—Variety of oak

Timul—A kind of forest plant grown in hot valleys

Tipan—System of threshing

Tisala, Tisali—Triennial

Topan—Puddling

Topo—Leaf umbrella

Trimaghi—Observances performed during the first three days of month
of Magh

Trisul—Trident

Uajao—*Hordeum himalayense*

Udyar—Hollow cavity in rocks

Uker—Earthing

Ukhal—Stone mortar

Unta—Variety of rice

Upraon—Dry cultivated upland slopes

Uram—Summer residence in Kali-Kumaon

Urd—Rayed kidney beans, *Phaseolus radiatus*

Wallgiya—Festival when curds and vegetables are offered

Ya Thal—Tibetan tax on sunshine

Yakalo—Cross between a buffalo and yak

THE SOCIAL ECONOMY OF THE HIMALAYANS

CHAPTER I

PHYSICAL FEATURES AND NATURAL REGIONS

THE Himalayas consist of a triple chain of parallel mountain ranges which enclose between them a number of beautiful elevated valleys. They give rise to three principal river systems, viz the Indus-Sutlej in the north-west, the Ganges-Kali in the centre, and the Brahmaputra in the east. The Ganges-Kali system, in its mountainous stage, is known as the "Kumaon Himalayas." It is also called the "Himalaya West" by local geographers. It adjoins the valley of Kashmir in the north-west, and that of Nepal in the south-east, and comprises the districts of Garhwal, Naini Tal, and Almora.

Of these three districts, our study is primarily concerned with Almora, which occupies the north-eastern part of this mountainous tract. It lies between latitudes $28^{\circ} 59'$ and $30^{\circ} 49'$ north and longitudes $79^{\circ} 2'$ and $81^{\circ} 31'$ east.

The Tibetan watershed separates it from Tibet on the north and the Naini Tal district on the south. On the east lies the Himalayan kingdom of Nepal, the river Kali forming the actual dividing line. The western boundary consists of an irregular line of mountain peaks and river valleys. It starts from Nanda Devi, touches Trisul, and rivers Pindar and Ramganga, and passing through Badhangarhi ends at Deghat on the Banau.

Politically it is one of the three districts of the Kumaon civil division of the United Provinces of Agra and Oudh in British India.

The district lies fully within the Himalayan system. A greater part of it falls entirely within the higher mountain zone, and is a mass of tangled peaks and valleys. The country consists of a succession of deep gorges and steep and precipitous hill-sides and declivities, derived from the snow-clad range, from which the ridges trend in a

southerly direction. The height above sea-level varies from 1,000 feet at the foot of the hills to 25,660 feet at the summit of Nanda Devi—the highest peak in the British Empire.¹

The distant scene is one of apparent confusion, with ranges of mountains piled one above another in endless succession, until they fade into a dark blue haze in the far distance. Beyond, the snow peaks glitter along the entire northern horizon. But the geographer knows well that by following the river systems up to their source a rough idea of the length and direction of the principal mountain ranges may easily be obtained.

The inaccessibility of the snowfields, ravines, and distant ranges has made it impossible to measure accurately the area of the district. The survey area of 5,355 square miles is doubtless the area of the projection of the district on the horizontal plane. In 1920 the area, according to the professional survey, was 3,430,000 acres, the corresponding area in the village papers being 3,427,000 acres. Of this, 3,062,000 acres consist of forests and hills, the largest area of its kind in all the forty-eight districts of the United Provinces. The cultivated area is only 295,000 acres. Cultivable waste, other than fallow, accounts for 35,000 acres. This is the only district in the province which contains no land whatever falling under the category of "current fallow."

The whole of the district, as we have said, is mountainous. On account of their scenic beauty and their healthy climate the mountains of Almora are of more than local importance. They also feed some of the important sources of canal irrigation for the United Provinces, which they supply with valuable timber, fuel, and grass. Their influence, both as barriers and as a refuge, is apparent. They have bred hardy mountaineers, and have divided them into small clans having separate dialects, customs, and social habits which are of singular interest.

The district contains within its area portions of the three well-known Himalayan chains, the Snowy Himalayas, the Trans-

¹ The following are the eight highest peaks of the world (heights as determined by the Survey of India), viz. Mount Everest, 29,002 feet, K 2, 28,250 feet, Kangchenjunga, 28,146 feet, Mkalu, 27,790 feet, T 45, 26,867 feet, Dhaulagiri, 26,795 feet, XXX, 26,658 feet, Nangaparvat, 26,620 feet, but, strictly speaking, none of these is within the British Empire. Colonel S. G. Burrard, Superintendent Trigonometrical Survey of India, has determined the heights of Everest as 29,141 feet, Kangchenjunga 28,225 feet, and K 2, 28,191 feet.

Himalayas, and the Sub-Himalayas Nanda Devi, and the Nanda Kot and the Trisul groups, covered with eternal snows and ice, form part of the Central or the Snowy Himalayas North of this central chain is the Kailash group, more arid and lower in altitude, representing the Tibetan or Trans-Himalayan chain South of the Central Himalayas is the outer and lower chain known as the Sub-Himalayas It is covered towards the north with extensive forests, but towards the south it is habitable and prosperous

In order correctly to understand the trend of the mountain ranges in Kumaon, the location of the Tibetan watershed has to be taken into account It forms part of the northern boundary of the district, and is a ridge of great altitude Throughout the greater part of its length it is a simple longitudinal range, running in a north-westerly and south-easterly direction Its average altitude is upward of 18,000 feet, and its highest peak, Kamet (conquered in 1931 by Mr F S Smythe), reaches a height of 25,447 feet At no point it is possible to reach Tibet from Kumaon without rising to nearly 16,800 feet, as at Lepulekh and Niti The passes, as a rule, are upward of 17,500 feet above sea-level

The great snowy mountains, which look like white-crested waves, and form such a conspicuous feature of the Himalayan scenery, lie not along the course of this watershed, but from twenty to thirty miles to the south of it They are situated in groups at the southern extremity of the snow-clad spurs, extending south of the water-dividing ridge, and may be regarded as a series of spurs thrown out by the watershed

A number of streams, flowing through deep canyons, separate the mountain ranges from one another, and carry away the water of the southern face of the Tibetan watershed to the Outer Himalayas The ranges are roughly parallel, but by no means uniform along their whole course Each of them branches out into numerous spurs of various heights, running in every direction But all of them, however insignificant, culminate in a snowy peak in the background

The chief of these groups is Nanda Devi, worshipped by the mountaineers as the Guardian Goddess It is somewhat lower than Gaurishanker (Mt Everest), and is the highest peak in the British Empire (25,660 feet) It is a huge, flat-headed, grey monolith, rising

behind the white Trisul, the south face of the mountain being so steep that snow cannot lie on it. Nanda Kot (22,530 feet) and Trisul (23,406 feet) form the flanks of Nanda Devi, and lie on the boundary in the north-west, between Almora and Garhwal. The Panchachuli and other minor groups, though in themselves of vast proportions, assume a secondary importance when compared with the Nanda Devi group. The Panchachuli series divides the river Gori from the Dhaulī. Its highest peak is 22,661 feet above sea-level. The great clusters of the snowy peaks separate the large river basins from one another, while the smaller groups make further subdivisions of these basins. In other words, the bases of the mountains are invariably divided from each other by streams of greater or lesser magnitude.

The perpetual snowline lies at a height of 16,000 to 17,000 feet, though during the summer, in some places, it rises to 18,000 feet.

In the higher Himalayan valleys there are great fields of ice—the Himalayan glaciers. They are hundreds of feet thick, and extend for miles. The best known are those of Milam, Pindari, and Panchu. The first of these extends right up to Tibet, the greatest width being some 25 miles. It is the largest glacier in the Kumaon Himalayas. Pindari is the most accessible, and perhaps the most beautiful of the three. It is about 2 miles long and from 300 to 400 yards wide, and, roughly speaking, occupies the interval between 12,000 and 13,000 feet above sea-level. These glaciers slip away slowly and imperceptibly down the valleys, wearing off the surface of their beds. At the foot of the valleys they melt, and the melted ice, carrying mud and gravel with it, forms the streams which feed the rivers. Thus the glaciers not only act as reservoirs, but also fertilize the plains below.¹

Next in importance to the mountains come the rivers. In addition to altering the face of the country, they determine the centres of civilization and the routes of communication. The configuration of the country is best understood by considering the fall and direction of the rivers. Of the three stages—mountain, plain, and delta—that mark the course of a river, the Himalayan region exhibits the moun-

¹ In India it is only in the Himalayas that it is cold enough for the snow to form into ice. The soft snowflakes become hard and granular owing to enormous pressure.

tain stage only. The rivers in this stage are roaring torrents. They descend in a series of rapid slopes, and carve out their own narrow channels amidst the masses of hard rocks, carrying great boulders along with them in the fury of their downward course.

The larger rivers of Almora all run south-eastward to join the Kali, since the main watershed runs in a south-westerly direction from the Nanda Devi group, above the Pindar river, to Lobha in Garhwal, and Bhatkot in the Almora district. There are only two rivers in the district which do not eventually join the Kali: the Kosi and the Western Ramganga, and these are exceptions because they rise in the forest-clad sub-Himalayas. Both rivers flow to the plains as independent streams. Barring these exceptions, the following are the large rivers, all of which fall into the Kali, affording a model example of a concentric drainage system: the Dhaulī and the Gorī, the Ramganga (eastern), the Sarju, the Gumtī, the Lohavati, and the Ladhīya. Out of these the Kali, the Dhaulī, and the Gorī rise in the glaciers, and the Sarju and the Ramganga at the southern base of the snowy range, while the rest have their sources in the oak-clad ridges of the sub-Himalayas.

The Kali (Sarda) rises from the Kuthiyānctī, and follows a south-westerly course, which runs almost at right angles to the Tibetan watershed. It is joined by innumerable streams of greater or lesser magnitude, which flow in a south-easterly direction and unite with it almost at right angles. The Gorī, the Dhaulī, the Sarju, and the Ramganga all follow this rule, and so also their smaller tributaries.

The beds of these rivers are for the most part narrow and precipitous intervals between the mountains, though here and there they open out into wide and fertile areas, where alluvial soil has been deposited, and the waters of the rivers are available for irrigation. Such areas, or "alluvial fans," as Brunhes aptly calls them, are rarely found on the largest rivers, such as the Kali and the Gorī. The fans of the Kosi and the Western Ramganga are exceptions, and are well known throughout the district for their fertility. Generally the larger rivers have little effect on irrigation and cultivation. The smaller streams are more widely utilized, as their water is more easily made available.

Mountain features impose severe handicaps upon transport lines,

and the beds of the rivers alone permit of access into the district, whether from the plains in the south or from Tibet in the north. Hence the passes that give ingress to the district are always found to follow the openings formed by the beds of the rivers.

The district is situated within the temperate zone, and is remote from the sea. The sea has thus no influence on its climate, and the distance from the Equator is immaterial, owing to the influence of the snow-clad Himalayas. The only factors which determine climate here are the direction and height of the mountain ranges and the nature of the soil.

Although the district lies close to the tropics, it furnishes, like Bolivia, every gradation of climate, from the sultry and suffocating tropical heat of the Bhabars to the Arctic cold of the snow-capped peaks.

Generally speaking, the district has two very distinct types of climate. According to the classification of climates made by Köppen and Flahault, these two types are *Hekistothermal* and *Microthermal*, i.e. cold and moderately cold. The extreme northern portion has a mean temperature of less than 10° C (50° F), even during the hottest month. It is thus entirely Tibetan in this respect. Here the trees disappear, having assumed dwarfed and spindly forms in the transitional zone.¹

The transitional zone below these perpetually frozen deserts has the "climate of the Birch." The summer is short and the winter very severe, all ground being covered with snow from October to April. Everything is buried under the snow, and all living beings, human and otherwise, migrate towards the south. The southern portion is entirely Indian from the climatic point of view. It corresponds to Köppen's "climate of the deciduous oak." The order of the three seasons is the same as in the plains of upper India: a well-marked winter with occasional falls of snow is followed by a summer of almost sub-tropical heat, which is again succeeded by the season of heavy periodical rains.

According to the hillman's computation, the three seasons are

Ruri—hot season—the middle of February to the middle of June

¹ Cf J. Brunhes, *Human Geography*, p. 239.

Chaumas—rainy season—the middle of June to the middle of September

Hyun—winter—the middle of October to the middle of February

In the first half of *ruri*, or summer, local storms, accompanied by thunder and lightning, are frequent, and are known as *chal basant* owing to their extremely short duration. They are confined to the vicinity of the high mountains and are extremely local in their effect. The crops in half the fields may be cut to pieces, while in the other half they are left untouched.

The hot spell generally begins about mid-April, but the gradual rise of temperature begins in March. From April onwards the distant peaks of the Himalayas become obscured by haze, which grows thicker and more impenetrable to vision with the increasing heat of the season. It is cleared away for a while by the occasional rains. Throughout May and the first half of June the nights remain cool, but the heat during the day is tropical. The highest temperature is recorded in the middle of June. It is followed by the break of the monsoon.

The rains cease in the middle of September, and the temperature begins to fall by the end of the month. October and November are the most delightful and healthy months, with a bright and pleasing sun, and cold nights. November gradually ushers in the winter, which is definitely established in December. No winter passes without a temperature below the freezing-point. The cold spells occur chiefly in December, January, and February, but snow sometimes falls in November and March, and light fires are often required even in October. During the winter the people seek the sunshine, performing most of their tasks out of doors.

But the range of temperature is greatly influenced by the physical conditions. Thus, the climate of the river valleys is always trying. From March to October the valleys are no more agreeable than the tropical plains, for being shut in by the hill-sides, which reflect the rays of the sun, the middle of the day is extremely very sultry. The relatively low level and the thin mountain air make the heat very depressing. Places like Vykiasen, Masi, Chaukhutiya, and Bageshwar

(3,200 feet) are difficult to live in after April. During the cold weather, from November to the beginning of March, the valleys are usually shrouded in heavy mist for the greater part of the forenoon. They are very hot by day, and very cold by night, when frosts occur.

In open hilly situations, even 500 to 1,000 feet above sea-level, the climate is not subject to the same extremes of heat and cold, although in all places below 5,000 feet the heat is excessive during May and June, the maximum temperature in the shade ranging from about 94° at this altitude to 110° in the valleys. But generally speaking, the higher the level, the lower the temperature. An ascent of 1,000 feet produces a fall of 3½°. Thus on the highest peaks it is always freezing,¹ although they lie but a few hundred miles from the tropics, the cold being so intense that frostbite often occurs—the actual freezing of the blood in the hands and feet.

The snow-capped peaks of the Himalayas very greatly reduce the temperature of the regions in their immediate vicinity. The air cooled by their contact, growing heavier as it cools, sinks into the valleys below. When a current of air seeks to cross the snow-clad peaks it expands and cools, and as it is often saturated with moisture, there is usually a heavy rainfall in the areas surrounding the snowy peaks.

The variation in the vegetation also influences the local temperature, for example, the difference between the temperature of a well-wooded hill-top and that of the valley below may vary within twenty-four hours from 9° to 24°.²

In places between 5,000 and 6,000 feet above sea-level, the temperature approximates that of southern and midland England in summer. In Almora (5,949 feet) the thermometer registers about 80° to 90° in the shade. During the coldest part of the winter the mean temperature is 40°. In Ranikhet (5,980 feet) the minimum and maximum are 26° and 87° respectively. The mean winter temperature at 7,000 feet is 40°. At 9,000 feet it is 32°, at 12,000 feet the temperature is never below freezing-point between May and October, and at 15,000 feet it is seldom above freezing-point even in the summer.

Rainfall makes for agricultural prosperity, and also scours the

¹ Cf. "Mountains make their own weather."

² Forests help to equalize the climate.



THE SNOWY OR CENTRAL HIMALAYAS WITH A TYPICAL SUB-HIMALAYAN VILLAGE IN THE FOREGROUND

The glittering serrate peaks are

- (1) Nandaghunti, 21,286 feet
- (2) Tri ul, 23,406 feet
- (3) Nanda Devi, 25,660 feet
- (4) Nanda Kot 22,200 feet



THE MITHAM GLACIER

which extends right up to Tibet and is at places more than 25 miles in breadth



PLOUGHING IN THE HIGHEST HIMALAYAN HABITATIONS

(Village, Martoli, 11,070 feet)

surface of the ground. Soil erosion is perhaps more pronounced in this Himalayan district than anywhere else in the province.

Most of the rain falls during the monsoon months of June to September. The *chota barsat* (period of preliminary rains) usually begins about June 15th, but the regular rains set in a fortnight later.

Of the two branches of the south-west monsoon, the Arabian Sea branch brings only a small proportion of the rain, the "Bay" branch, which blows towards the Ganges, furnishing the remainder. It generally grows weaker and weaker as it passes up the Ganges valley, and it yields more rain on the north side of the district, in the neighbourhood of the Himalayas, than on the south.

The winter rains generally occur in January and February. The vast area of snow on the Himalayas, and the cold westerly wind from the Iranian plateau, cool the moist air, producing rainfall on the lower Himalayas in the winter and early spring.

According to the hillman, the monsoon rains come from the plains and the winter rains from the Himalayas.¹ This is to some extent borne out by the direction of the clouds. During the summer the clouds come from the direction of the plains, while during the winter they form in the Himalayas themselves. Moreover, the winter rains vary inversely with the distance from the snows.

It is very difficult to give any statistics of rainfall for the whole district, since the rainfall of a given locality generally depends on its surroundings. Owing to the height of the mountains in the northern half, the rainfall (including snow) is there more copious than in the southern half of the district. Generally, the rainfall is greatly affected by the proximity of the high ridges, which catch the clouds and precipitate their moisture. The maximum falls are found where a general increase of elevation occurs, as in the region that lies beneath the snows and the Bhabars. The forest-clad regions also have a greater rainfall. Open localities surrounded by lofty mountains get less rain than the high ridges and their outskirts. The monsoon rains are heavy in the vicinity of the high hills and become lighter as the distance from them increases. The observed average annual rainfall varies from 40 inches at Almora and Ranikhet to 98 inches at Tanakpore. As a rule, no month passes without rain falling in some part of the

¹ Cf. the local proverb "Hyun Himal, Chaumas Mal."

district The driest months are November, December, and April, when the rainfall is very scanty

The regular rains usually start at about the same time, when the monsoon reaches Bombay The preliminary showers are heavy, and accompanied by northerly and westerly winds Their scouring action is very pronounced, and they do enormous damage by eroding the dry and powdery surface On account of the rapid slope of the hill-sides the rain quickly drains off them, and a long rainless interval is exceedingly injurious to the crops

The famine years are characterized not by excessive or deficient rainfall, but by untimely rains According to a local proverb, for each star seen during the months of August and September, one hundred *khars* (nearly 50 tons) of grain are spoilt

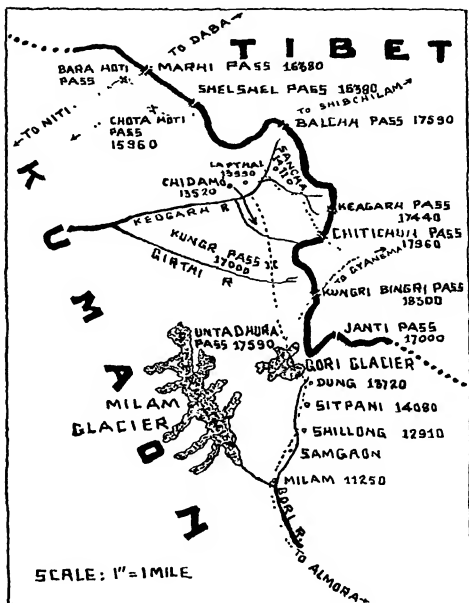
The old men often complain that the rainy season and the winter are not so well defined as they used to be Years ago, they say, the snow used to fall up to one's waist or shoulders, and the cold was so severe that even oil used to freeze They are all agreed that the district is much less abundantly watered than of old This contention seems to be borne out by the following figures

1892	54 4	1896	51 8	1921	51 27	1926	38 66
1893	56 9	1897	55 3	1922	54 93	1927	48 87
1894	69 5	1898	81 3	1923	42 56	1928	34 46
1895	90 0	1899	80 2	1924	60 68	1929	45 09
		1900	61 2	1925	42 18	1930	30 60
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Total	270 8		329 8		251 62		197 68
Average	67 5 in		66 in		50 32 in		39 54 in

RANIKHET

	<i>in</i>		<i>in</i>
1921	72 65	1926	48 15
1922	73 55	1927	64 30
1923	43 51	1928	41 81
1924	77 20	1929	47 44
1925	54 62	1930	38 93
		1931	49 80
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Total	321 53		290 43
Average	64.30 in		48.40 in

During the last five years 60 inches less rain fell in the district than in the period 1921-25



The Tibetan or Bhotiya region has a very scanty rainfall, since it lies behind the snowy ranges, and such moisture as is deposited falls chiefly during the cold weather in the form of snow. The winter falls here are heavier than to the south of the snows. Places like

Milam get barely 5 inches of rain in July, August, and September, but in the winter the whole valley is blocked with snow. Here landslips and avalanches often do great damage during the summer.

This brief description enables us clearly to distinguish the various natural regions, which are both climatic and orographical. The district presents a striking similarity to the mountain regions described by Brunhes in his *Human Geography*.

In the extreme north—that is, in the upper parts of the *parganas* Johar, Darma, and Malla Danpur, excepting the river basins—the country is snow-clad and rugged, steep, inaccessible, and traversed by glaciers, the altitude exceeding 13,000 feet. In climate it is wholly Arctic. The winters are so long and the summers so short that one season's snow has barely melted when the accumulation of the next begins. It is not only bleak, inhospitable, and rugged, but absolutely barren, so far as vegetation is concerned. To quote Brunhes's phrase in another context, it represents "a region unknown to scientific geography."

Immediately beneath the snow-clad mountain and glacier region is the transitional zone—the sub-tropical Tundra. Like the Siberian Tundra, this region is buried for two-thirds of the year in snow. In the summer the snow melts and the surface soil thaws to the depth of a few inches. Encouraged by this scanty nourishment, various quickly maturing growths, such as mosses and lichens, some flowering annuals, and a few shallow-rooted bushes, transform the aspect of the landscape. The two characteristics of the Tundra—the dwarfing and the gradual disappearance of trees, and the preponderance of mosses and lichens—may be seen here on a small scale.¹

Below the transitional zone are the high grassy slopes, locally known as *bugyal* or *payar*, the summer homes of mountain shepherds and graziers—the Bhotiyas. The trees in this region (which lies between 10,000 and 13,000 feet above sea-level) become stunted, and are replaced by the natural summer pastures, which resemble the rolling grassy downs of the Khirghiz among the Tian-shans. The region, though high and mountainous, is by no means precipitous. It lies under snow during the winter, but towards the end of March, when the snow begins to melt, it becomes covered with verdure, and sup-

¹ Cf. Herbertson & Herbertson, *Senior Geography*, p. 4.

ports a thick carpet of grass and herbage. This grass and herbage is found to be peculiarly nutritious to sheep, and a few days' grazing on it restores their chilled and famished bodies to their normal condition. Hence from the beginning of April it is the resort of the numerous flocks of the Bhotiyas, who remain here until the beginning of the rains. It is here that the highest Himalayan habitations are found.

To the south the fine grassy slopes imperceptibly pass into woodlands, in which the trees gradually become larger, more numerous, and of more varied species. It corresponds with the *taiga* of Siberia, and is densely overgrown with fine forests of pine, oak, and rhododendron. Its average altitude ranges between 6,000 and 10,000 feet. Typical of this region are the forests of Bhatkot, Airdeo, Dunagiri, Shiahdevi, Devidhura, Dhway, Manila, Jaurasi, and Chaubattia. Generally the slopes which face northward are more thickly wooded than the southward slopes, as in the former the sun's rays only slant across the surface, and the moisture is retained in the soil for a longer period. With the decrease in elevation a gradual change in the composition of the forest is observed. The hardiest forest tree, the birch, which is found even up to 12,000 feet, is succeeded by the spruces, larches, and firs. Below these is found the *tilonj* (*Quercus dilatata*), which grows up to 10,000 feet, but flourishes best between 8,000 and 10,000 feet, with an occasional mixture of red rhododendron. Between 7,000 to 8,000 feet the oak (*Quercus incana*) is the principal growth. The oak in its turn gives place to the conifers. The best known of the conifers is the Himalayan cypress (*Cupressus torulosa*) and the pine (*Pinus longifolia*). The pine flourishes best between 5,000 and 6,500 feet. The slopes immediately above the Kali and the Gori, in Malla Askot, present an excellent epitome of this plant variation. One passes from the *shusham* (*Dalbergia Sissoo*) and *sal* (*Shorea robusta*) in the river beds, through oak and rhododendron on the high hills, to firs, birch, and box on the still higher central ridge.

The canyon country described by Brunhes is represented by the high gorges of the Kali and its tributaries—e.g. the Gori and the Dhaulī. The calm and evenly flowing rivers which one sees in the plains are here veritable cascades, hurtling down between the lofty precipices and declivities. The chief characteristic of the water-courses in the Bhotiya tract is that they are full of deep canyons,

flanked by giant precipices. Their beds consist of rocks, stones, and snow, over which the rivers run with extraordinary violence and rapidity. Falls and cataracts between 600 and 1,000 feet in height are common. The canyons are sometimes so deep that tropical vegetation is found even in the close proximity of the snow-clad ranges as in Askot.

Gently sloping ground occurs in the southern half of the district, which is mostly cultivable. The slopes of the hill-sides are rarely so precipitous as to make terracing impracticable. The river-beds begin to enter the plains stage, and expand into wide delta-like spaces, or "alluvial fans," as Brunhes calls them, which are exceptionally fertile, producing luxuriant crops of rice and other tropical plants. A little higher than the fans lies the terraced land, extending with intervals to the hill-tops, which run up to 5,000 feet. The moderate gradients of the slopes make irrigation and grazing possible. Their smooth descents and gentle profiles are in pleasing contrast to the rugged scenery about them. The rich level basins, which consist of fine alluvium, support the greater part of the inhabitants. It is here that the densest population is to be found, growing cereals, vegetables, and fruits, both tropical and sub-tropical. Cultivation here is both extensive and intensive.

Immediately at the foot of the hills is a narrow belt of country called Bhabars, covered with forests of tropical growth, and remarkable for an entire absence of water. In the background the hills are clearly visible, presenting a wall of forest-clad slopes and heights rising steeply from the plains. The whole region is full of boulders and gravel brought down by the streams. In the shingly subsoil, above which lies a thin layer of alluvium, the drainage quickly percolates, and the upper soil is left arid and waterless. The trees of the forests receive the moisture from the vapour-laden air during the summer months, but during the rains the various streams cut the surface, the heat is tropical, and the rainfall excessive. These conditions, combined with the fertility of the alluvial soil, support a luxuriant and tropical vegetation. Hence, during and after the rains all uncultivated and open ground is covered with grass 8 to 10 feet in height; and elsewhere with dense forests, the chief components of which is the *sal* (*Shorea robusta*). Between the heights we find a series of savannah-like valleys, some of which

are entirely covered with *sal*, broken by ravines, and wholly waterless

South of the Bhabars, but above the cultivated plains, is the broad belt of jungle grass and swamps known as the 'I araí. It is some ten miles in width, and runs parallel to the foot of the outermost Himalayas. Here the streams that disappeared in the Bhabars flow sluggishly or end in stagnant pools. Marshes and fens, oozy streams, and water-choked morasses confront us at every step. "Water here is so near the surface that whenever a buffalo rolls in the mud or a stick is pushed into the soil, a spring gushes out."¹ This humidity, combined with the tropical heat, encourages the growth of reeds and grasses of extraordinary height and thickness. Here, during the summer months, wild animals, such as the tiger, elephant, rhinoceros, buffalo, and deer, and pythons that are capable of swallowing calves and fawns, find an ideal home. "At nightfall the mist raised from the saturated ground by the fierce heat of the sun collects like a pall over the landscape."² This region is the home *par excellence* of malaria and other fevers. Yet even here jungle folks such as the 'I harus, Bhokshas, and cognate tribes have their settlements, constantly extending the frontiers of cultivation, waging in spite of disease their unrelenting fight against the forest and the marsh.

¹ J. H. Batten's *Report on the Tarai*, p. 146

² *Ibid*

CHAPTER II

AGRICULTURE IN THE REGION OF THE HIGHEST HIMALAYAN HABITATIONS

(THE BHOTIYA REGION)

IF we draw a straight line across the district from Kapkot to Askot, the area to the north-east of this line constitutes the region locally known as the *Bhot* or Bhotiya tract, which is entirely distinct from the remaining, south-western portion of the district. It comprises the five inter-Alpine valleys of the snowy range bordering on Tibet. These are all situated at heights varying from 10,000 to 13,000 feet above sea-level. To the north of these valleys is the Tibetan watershed and to the south the high peaks of the Snowy Himalayas. These are cis-Tibetan, lying within the British frontier.

Counting from the west, the first two valleys are those of the Saraswati or Mana group of watercourses, and the Dhaulī (western) or Niti group. But these rivers are the tributaries of the Ganges, and strictly speaking their valleys form part of the Garhwal district. But the three remaining valleys—Johar on the Gori, Darma on the Eastern Dhaulī, and Byans on the Kali—lie within the district proper. These three rivers combine lower down to form the Sarda.

Each of these valleys is the work of the glaciers which lie immediately above them. Like the Alpine valleys, they have been widened and made habitable by the erosion and grinding of the hard rocks. Apart from these narrow and inaccessible river valleys, or "glacial banquettes," as they are termed by W. Karian, the entire tract consists of "montane deserts," full of barren rocks and beds of snow. "In ruggedness of features they are not surpassed by any inhabited tract of the world, and such is the irregular and confused appearance of the mountains, that it is the line of the river valleys alone that enables us to find a clue to their arrangement, and it is precisely along these rivers that the Bhotiya village lies"¹

Roughly speaking, the area of this region is one-third of the entire

¹ E. T. Atkinson, *N W P Gazetteer*, vol. xii, p. 84.

district, but only one-sixteenth is inhabited. The area under cultivation is even smaller than the area inhabited. It is not quite 8,000 acres, exclusive of the unmeasured waste. The population, on a rough estimate, is one-twentieth of the total population, being 27,366, whereas that of the whole district is 525,104.¹

For more than half the year, from October to April, the entire region is covered with snow, which varies in depth from 6 to 12 feet. By the end of April the snow begins to melt, and by the first week of June all the snow has been dissipated, except in the ravines and hollows. The seasons of spring, summer, and autumn are comprised within the five months from May to September. During the summer the thermometer at sunrise stands between 40° and 50° F.

Rain, as we have seen, is very rare and scanty, on account of the cis-Tibetan situation, but dense clouds and mists are quite common, with occasional falls of snow, even during the five habitable months.

Settlement, as already mentioned, follows the principal drainage lines. Hence all the highest habitations are on the banks of the rivers. They are all situated to the north of the points where the rivers cross the line of the great peaks at an elevation of 9,000 to 12,000 feet. At the head of these valleys are the Tibetan passes through which the Bhotiyas travel and trade in the Tibetan markets. The villages are situated on comparatively open ground.

There are about fifty centres of population in the five valleys, the chief among them being the following:²

Garbyang in Byans at an altitude of 10,320 feet

Kuti in Byans at an altitude of 12,330 feet

Bungnal in Darma at an altitude of 11,650 feet

Go in Darma at an altitude of about 11,000 feet

Milam in Johar at an altitude of 11,706 feet

Lwan in Johar at an altitude of about 19,000 feet

Martoli in Johar at an altitude of 11,070 feet

Mana in Garhwal at an altitude of 10,560 feet

Niti in Garhwal at an altitude of 11,464 feet

¹ By 1931 the population had increased to 583,302.

² The highest known habitation of the world, according to Brunhes, is in the Maritime Cordillera, Peru, at a height of 17,100 feet above sea-level, but the Himalayan habitation of Lwan is some 2,000 feet higher. I believe Lwan to be the highest habitation in the world.

All these habitations bear the stamp of their environment. All are entirely different from the other villages of the district. Man's adaptability to his regional environment may be profitably studied here. The mountain chains separating the valleys are formidable and difficult to cross, hence all the valleys are isolated from one another. This isolation compels the villages to become practically self-supporting. Each narrow river valley is an entity by itself. It has its own mode of living, its own tastes and social customs, and sometimes even its own dialect. The distribution of agriculture is also determined by geographic factors, e.g. altitude, climate, rainfall, nature of the soil, and the facilities of communication. None of these is favourable, and hence the agriculture is of primitive type, and confined to small plots scattered along the river valleys.

These scattered plots are like oases in these montane deserts, which are too rugged and too cold for profitable cultivation.

Owing to the high elevation, and the difficulties of transport and production, the region is very thinly populated, the density of population being less than 5 to the square mile. This density is below the minimum required for properly developing the region. Nurtured in these bleak and inhospitable lands, the people are not only hardy and brave, but nomadic in their habits, spending only a month or two in their villages. They are sturdy and of middling stature, their complexion is white, enlivened by ruddy cheeks, racially they belong to the "Mongolian type." They are thrifty, shrewd, and enterprising, and can turn their hands to many things. They are always cheerful, and lighten their journeys by laughter and song. The environment has made them not only superstitious demon-worshippers, but also dirty in their habits. Water is shunned, and clothes are washed only occasionally.

The Bhotiyas place little reliance on cultivation and pursue it only as a subsidiary occupation, during the five months from the middle of May to the middle of October. Cultivation is practised not only on the alluvial cones, but also on the mountain-sides. The soil consists of material transported and deposited by the glaciers. It is composed of particles of various sizes, from finely ground clay to huge boulders, all mixed together. It contains much vegetable matter washed down by the snows, and is black in colour.

Cultivation is carried on chiefly with the hoe (*hackbau*), cultivation with the plough (*ackerbau*) is very seldom found. The fields are so small, steep, and irregularly shaped that they cannot be worked with the plough. They are few in number, and very narrow, and it is unusual to see more than ten or twelve in a flight. They are full of glacial deposit,¹ with numerous great boulders lying in the midst of the cultivated patches which greatly aid germination by transmitting heat to the soil. The terrace walls are often very high, and also of glacial soil, and are easily destroyed by the action of avalanches of rock and snow. Terracing is seen up to a height of 11,000 feet. To an eye which has been accustomed to the excellent terracing near the town of Almora they present a very strange contrast. Near the river-beds terraces are entirely absent. Here one sees the big field, which is divided into smaller plots by artificial lines, just as in the plains. No drains are necessary because there are no rains. This absence of rain eliminates the difference of fertility between level and sloping ground.

The fields adjoining the homesteads are heavily manured, but elsewhere manuring is unusual. The soil, as a rule, requires huge quantities of manure, in order to be productive. The dung of sheep and goats is the only manure known to the people. Often it is used when quite fresh, when it acts as a destructive agent instead of benefiting the crops.

Agricultural methods and implements are extremely crude and clumsy. The people are not handy with tools, and have developed a technique of their own. They have few ploughs, and a very small variety of other implements. The principal implement is the *kutla* (hoe)—an iron hook with a wooden handle, used both by men and women. Harrows, rollers, cultivators, and spades are unknown. The common implements in daily use are the sickle, the axe, and the hoe. The plough is usually drawn by the men, and occasionally by the *jibu* (a hybrid of the yak and the cow). When man-power is used, a rope is tied to the beam and fastened round the waist of the man dragging the plough. In his hands he holds a stick, with which he assists his forward progress. The ploughshare is guided by a second man, just as though an ox were yoked to the plough. Occasionally a

¹ In Byans some remarkable specimens of terraces due to glacial action are visible.

couple of men will draw the plough, but then they rarely use sticks. When the *jibu* is employed it is saddled with a primitive saddle of wood and iron. One *jibu* alone serves the purpose of two oxen, but in addition to the ploughman, a man is needed to lead the *jibu*, which he does by means of a halter, which pierces the nose of the beast. Recently the ox has been introduced, but owing to the rigour of the climate and the nature of the fields it is not proving a success.

Ploughing begins as early as the melting of the snow will permit, and soon after the Bhotiyas have come up from their winter resorts. It is effected only once, whether beast or man draws the plough, no second ploughing is thought necessary. The seed-time varies like the harvest, according to the local temperature. The harvest grows later and later as the elevation increases. Sowing is often completed by the first week of June. The season of growth is very short, consisting of four months. Only one harvest is possible, which consists of spring-sown crops, and in some years even this is not reaped, owing to untimely snowfalls. Wheat and barley, which in other parts of the district are sown in October and November, are here sown in June, when the rest of India is growing paddy and millet, and reaped in September instead of April. Double-cropping is here an impossibility.

There is seldom any rotation of crops, nor is there any need of it, because only one harvest is reaped in the year. Every year, from October to April, the land lies fallow. In some lower levels the rotation practised is amaranthus (April to August), followed by mustard or barley (August to October). Recently some of the Bhotiyas have introduced a change in their crops. In one year they sow buckwheat, in the second year barley, and in the third mustard. There is thus a complete rotation in three years. New crops of vegetables have also been introduced recently, e.g. cabbages and turnips.

Irrigation is practised in some of the oases. It is generally possible on the alluvial cones, built out by the tributaries of the main streams. The people are not as yet able to lift water from the river into the higher fields. Small streams formed by the melting of snow and glacier ice are led over the impermeable soil of the glacial mud to the fields whenever available. The volume of water in these glacial

torrents is greatest at midday, on account of the heat, and it shrinks considerably during the night. Artificial channels of stone and wood are also utilized.

Wheat and barley are irrigated right up to the time of reaping. Irrigation here assumes a greater importance than elsewhere, because of the lack of rain. In many places without irrigation the crops cannot be raised at all. In Niti, for instance. Usually the land surrounding each village is carefully irrigated.

Rainfall here means snow, hail, and storms, even during the summer months. It is accompanied by excessive cold, heavy landslips, and destructive avalanches. The occurrence of a great number of avalanches not only destroys the patient toil of many days in the fields, but also causes great hardship and inconvenience to the inhabitants. Many roads are destroyed, and communication with the outer world entirely blocked. Sometimes, as in Mana in the year 1822, the whole village is engulfed. Avalanches are thus the greatest and most formidable obstacles, not only to agriculture, but also to the development of the entire colony. There are three principal protective measures against them: wooden fencing, stone fencing, and afforestation. Thus in Milam and Bilju, on the slope behind the village, furze and juniper bushes grow, as in the other high-lying settlements of the districts. They are religiously preserved, not for fuel, but because they help to bind the slope and check the fall of ice and stones. The bushes act as obstacles, preventing the fall of avalanches which might ruin the village. They are not only preserved, but planted whenever they decrease below a certain minimum. Anybody, even the headman of the village himself, if found even cutting the foliage, is severely fined, which means that he not only forfeits his rope and axe and the fuel thus collected, but pays a cash fine of a rupee in addition. The cash fine is utilized for objects of public utility: for example, the worship of the village god. Thus the local environment taught the people the benefits of forest preservation long before the modern scientific afforestation movement was born.

There are no agricultural pests, the risks to agriculture are represented by inclement natural forces. We have referred to the action of avalanches. Altitude has also its dwarfing effect, and prevents fruits from attaining any size or flavour.

Sometimes, towards the middle of August, the temperature becomes unsettled and liable to sudden changes. Snowfalls occur, and frost is seen in the valleys. When this happens the crops are completely ruined, and it is useless to harvest them. Occasionally the snow buries them just at harvest-time, and they cannot be gathered at all.

Severe winters attended with heavy snows also hinder the germination of the crops that are sown in the following summer.

Since the growing season is short, only the hardier and more quickly growing crops are cultivated. The stalks of all these crops are stunted and weaker than in the lower regions, on account of the dwarfing effect of the altitude. The most important crop is barley. It is of two varieties, the common and the Tibetan barley, known locally as *uajao* (*Hordeum himalayense*). The Tibetan barley is an important article of food among these snow-men, it is beardless and naked, like wheat. In irrigated places, like Burfu and Niti, it yields from twenty to thirty times the seed sown, but in poor and unirrigated plots the yield is only six times the seed. If the ground is stony and uneven, wheat is sown, whereas barley is grown in good and level soil, as wheat is said to thrive under more discouraging conditions than barley. But like barley, the Himalayan wheat (*naphal*) is grown in watered places only—for example, in Burfu and Changru—and is often an uncertain crop. It very seldom reaches maturity, and is far from abundant even in the most favourable years. Both the wheat and barley ripen very late, but are of a particularly good quality as regards flavour.

Amaranthus, which gives a crimson touch to the fields, yields twenty loads to the acre, and grows even in Milam. Its minute grains are parched, and eaten with milk or water. Its green leaves are eaten as vegetables. Other principal crops are mustard, *ogal* or *kotu* or *palti* (*Fagopyrum esculentum*) and *phapar* or *bhe* (*Fagopyrum tataricum*). *Ogal* is said to have the merit of not being injured by the mists, which in the rains settle on the tops of all the hills. *Phapar* yields from thirty to forty times the seed, and does not require irrigation. In recent years some attempts have been made to introduce cabbages and turnips. Apricots and peaches also are grown in places which are at a height of 10,000 feet.

By the middle of September the crop is ready for harvest. The sickle is not used, and the reaping effected in a peculiar way by the

women. They nip the ears with a kind of shears known as *riyanth* or *saryatha*. The *saryatha* consists of two smooth, round bamboo (*ringal*) sticks, each a foot in length. These are held in the right hand, and so manipulated by the fingers as to form a letter V, with a finger between the sticks at the point of juncture. The ears of wheat and barley are brought inside the angle of the V, and then squeezed with both hands, each hand pressing firmly the two ends of the sticks, so that the conical bunch of stalks becomes a straight line. The hands are then pulled upwards and the ears are nipped off and tossed over the shoulder into the bell-shaped basket (*doka*) slung on the reaper's back. In this fashion, nipping and pulling of the ears, and throwing them backwards over her shoulder into the *doka*, the reaper continues until the whole field has been nipped. The women have acquired such skill and quickness that the whole process appears to be quite automatic. The reaper's movements are interrupted only when the plants together with the stalks are uprooted. The stalks, in such cases, are separated from the ears by cutting them with a sickle tied to the reaper's waist. The method, on the whole, seems to be dilatory and cumbrous. Its only merit lies in the fact that it makes threshing and winnowing comparatively easy, as the amount of chaff is considerably reduced. The sickle, however, is gradually winning its way.

In threshing also, the region has developed its own technique. Treading by oxen (*dam*) is unknown, because of the small scale of production. A special threshing implement of oak wood is used, known in Johar as *dabala*, which is not unlike a cricket bat. It is wielded with both hands, and the ears are beaten with it. The surface of the *dabala* is generally divided into a number of sections by carved lines, which give it roughened surface, like that of a washerman's plank for beating cloth. Sometimes ordinary poles are used. Goats and sheep are driven together to graze on the stalks. There is no need to store hay and straw in stacks (*lutas*), as the farms are completely deserted during the winter. Owing to the absence of rice culture, the pestle and mortar are seldom found. Water-mills are rare, and hand-mills are only found occasionally.

The agriculture of the region is thus very precarious, and it is difficult to estimate the yield. It is sustained in these sterile tracks,

under circumstances so discouraging, only on account of the Tibetan trade, which is the mainstay of the people.¹ The yield from agriculture is not sufficient to supply the Bhotiyas with food, much less to afford a surplus. Large quantities of produce are imported every year from the Almora region, indeed, there is sometimes a surplus of imports. Whenever there is such a surplus it is not carried down to the winter resorts. The Bhotiyas have a special way of preserving it. The flaky bark of the birch-tree, which peels off like paper in large sheets, is a perfect preservation against moisture. The grain is wrapped in it and preserved in the rude caches, which are mere holes and excavations in the open ground. It is said that grain is unspoilt even when taken out after a lapse of forty years. This system is also an excellent protection against the Tibetan robbers who sometimes frequent these deserted places during the winter.

¹ Many of the wealthier Bhotiyas show a comparative aversion for field-work, and engage the *Jauthras*—a poor and unenterprising race of agriculturists—as tenants. These *Jauthras* are heavily indebted to the rich Bhotiyas, and act as their servants and drovers.

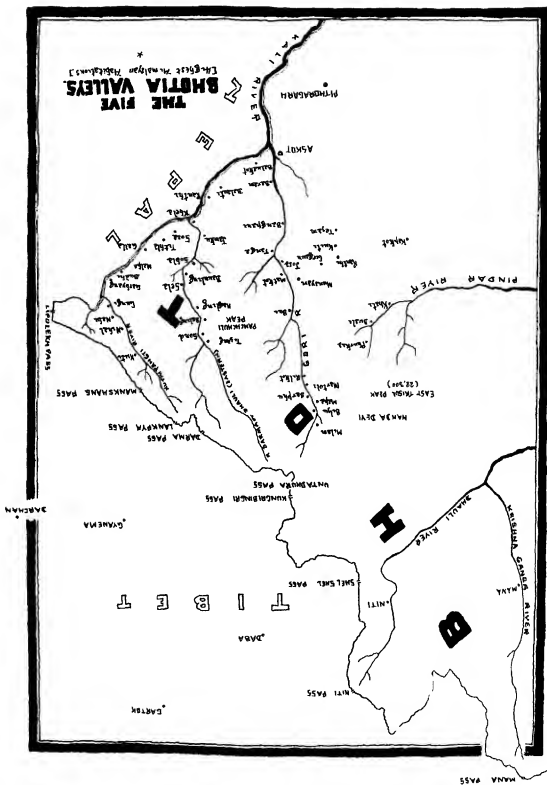


THAKUR DALIP SINGH

A retired Government servant and Bhotiya Riwayat of the Jol ar valley



THE BHOTTIYAS OF DARMA





SCENES FROM A FAMILY MIGRATION



PREPARING MIATS

CHAPTER III

THE NOMADISM OF THE HIMALAYAS AND THE ITINERARY OF THE NOMADS

BELOW the highest inhabited regions, and towards the south, are patches of forest, consisting of horse chestnuts, red rhododendrons, oaks, and pines, while white rhododendrons, kingpines, yews, and juniper grow at greater altitudes above them. Birch and goat-thorn are found on the edge of the snow-line. These forest patches are quite unclaimed, except that a few of them are exploited for fuel. To a man coming down from the extremely barren Tibetan passes these forests afford a pleasing contrast. Their gorgeous vegetation, interspersed with dense undergrowth and flowering shrubs, greatly delights his eyes, wearied of sterile monotony. In March and April, at the higher levels, the brilliant red rhododendrons form a beautiful contrast with the snowy peaks behind. As we travel downwards the vegetation changes. The following list gives the limits of this plant succession.

13,000 feet	Vegetation entirely ceases
12,000 feet	Birch and blue pine
11,000 feet	Himalayan silver fir, spruce, larch, yew, ground cypress, variegated bush rhododendron with flowers of all colours (pink, blue, purple, and white). Grassy slopes common.
10,000 feet	Sycamore, rhododendron and chestnut limit. Grassy slopes begin.
9,000 feet	<i>Tilony</i> (<i>Quercus dilatata</i>) and Kharsu (<i>Quercus semicarpifolia</i>) chiefly found.
8,000 feet	Oak limit. Hardier oak found with Himalayan silver fir.
7,000 feet	Pine limit, oak and rhododendron and Himalayan cypress in abundance.
6,000 feet	Deodar limit, oak and rhododendron (red) begin to give way to pine.
5,000 feet	Pine in abundance.
4,000 feet	<i>Sal</i> (<i>Shorea robusta</i>) limit. <i>Huldu</i> (<i>Adina cordifolia</i>), <i>Tun</i> (<i>Cedrela Toona</i>), <i>Sain</i> (<i>Terminalia tomentosa</i>), and <i>Dhauri</i> (<i>Lagerstroemia parviflora</i>).

Above 10,000 feet, and immediately adjoining the highest habitations, are fine grassy slopes. These pastures—*bugyal* or *payar* as they

are termed locally—are buried under the snow during the winter months. The snow begins to melt by the end of march, and the tops of the hills, which are moderately flat and open between 10,000 and 12,000 feet, become covered with verdure, and afford splendid grazing for sheep. The pastures grow poorer towards the line of perpetual snow. The grass growing here is known among the Joharis as *finchi*, and is considered to be the favourite food of sheep and goats. It is said to be so extremely nourishing and invigorating that only a few days' grazing is thought sufficient to refresh and fatten the jaded and famished animals. In point of quantity it is regarded as inexhaustible. The consumption during the day is more than compensated by the growth at night. Such ideal conditions for pasturage at such heights are possible on account of the high humidity (due to altitude) and the gentle slope and impermeability of the rocks. All these factors favour the growth of succulent vegetation.

These pastures, the best known among which are those of Dhakuri and Rokangsain, with those near Milam in Almora and Wan and Badarinath in Garhwal, are utilized only when the inhabitants adopt the habit of nomadism. The animals have to be shifted from pasture to pasture in search of new grazing grounds as soon as the nearer ones are exhausted. In order to meet the needs of the flocks that support him, man adapts himself to the environment and becomes a nomad.

Nomadism in the Himalayas, as in the mountain communities of the Balkans, Alps, Carpathians, Pyrenees, Andes, and Tian Shan, shows some common characteristics. Life here, as elsewhere among the nomads, is made up of regular and successive changes of place. It alternates between permanent and temporary habitations, according to the cycle of the seasons. It is intimately connected, as elsewhere, with property, with the proximity of permanent habitations, and with the existence of pasture lands which are dependent upon geographic conditions and the seasons. Everywhere these periodic migrations result from the necessity of finding new pastures and ensuring a food supply. Here, as among other nomads, long-established customs, traditions, and superstitions form the chief means of social control. All migrations imply a lack of stability and specialized skill and the frequent break-up of family life. But unlike the Alpine nomads, the

Himalayans have to traverse considerable distances and have large areas of land at their disposal. In the Alps the family seldom accompanies the nomad, but in the Himalayas the families also migrate so far from the preparation of milk and cheese being their chief occupation, the trade with Tibet forms the primary basis of livelihood. Goats and sheep are not milked at all, and cattle are more or less non-existent. The Alpine nomads are agriculturists and herdsmen, but the Bhotiyas are shepherds and merchants combined.

The Bhotiyas, like the Khirghiz, change their place of residence twice a year, together with their families. Besides ensuring the safety of the women and children, these family migrations provide additional hands for labour. The Bhotiyas have two sets of dwellings,¹ in addition to the portable tent which they use in the intermediate stages. The summer dwellings are all situated in the high cold valleys towards the Tibetan frontier, where the climate from May to September is very invigorating. Milam, Martoh, Burfu, Go, Garbiang, Kutu, and Nabi are some of these summer habitations. They serve as bases for the Tibetan trade, and as depots and stores for the exports to Tibet. It is in these Himalayan residences that the Bhotiya women and children with their flocks are left, when their menfolk are engaged in frequenting the Tibetan markets during the months of May to September. In winter, when the higher valleys are blocked with snow, the rigour of the climate compels the Bhotiyas to settle down in warmer and more convenient localities, such as Tejam, Dharchula, Sobla, Thal, Galanti, Nigalpani, and Askot. The families reside here from April to November. These two sets of residences are equipped with different sets of utensils, bedding, etc., in the case of the richer members of the community, but in the case of the poorer ones everything is carried up and down when the migrations take place.

There are three distinct varieties of migrations among the Bhotiyas. In the first, only the carrier-flocks and traders move, in the second, the families accompany the traders and their flocks, and in the third herds of cattle are moved in charge of three or four drovers, and accommodated in the *bugyal*. The following is the order in which these migrations take place.

¹ In the case of the Johari Bhotiyas, there are three sets of dwellings

April-May	First upward trip of Traders (<i>dhakarias</i>) with goats and mules
May-June	Traders—second trip
Mid-June	Families with <i>jibus</i> , etc
June-July	Camp followers, consisting of tenants, <i>doms</i> , and beggars
Mid-September	First downward trip
End of September	Second downward trip
October	Families descend

The traders with the carrier-flocks remain on the move throughout the year, except for a brief period during summer and winter. In addition to escorting their families, they go twice to Tibet and twice to the markets of the Bhabars and the Tarai. Only the strong-limbed and courageous men constitute this class. Exceptionally enterprising members of this class may even go once a year to some more distant trade centre, such as Cawnpore or Gartok (Tibet).

Immediately after the middle of April, when the fair at Thal is over, the Bhotiya trader starts on his upward march towards the higher intermediate camps, his flocks being laden with cereals, such as rice, *madua*, and barley, luxuries such as tea, cloth, brass, and copper wares, etc. The flocks consist chiefly of goats and sheep, which usually carry grain. The richer traders use hardier and more expensive animals—mules, *jibus*, and ponies, which carry heavier articles. The usual caravan of an ordinary well-to-do Bhotiya consists of 100 to 125 goats and sheep, 10 to 12 mules and *jibus*, and 3 to 5 ponies. Asses are not regarded as a dignified means of transport, and hence are not employed.

The merchandise is stored first in the intermediate camps—for example, Munsiri and Sobla. When all the goods have thus been brought up from the submontane markets, preparations are made, after a short interval, for shifting them to the upper residences in the passes. First a pioneer party sets out, and repairs the crude bridges and paths that have been damaged by the action of the ice and snow during the past winter. When the road has been cleared the same flocks that brought the goods from the lower country are laden once more, but this time lightly, on account of the hazardous and fatiguing nature of the track. The goods, which are worth thousands, are stored in the highest habitations, and the traders return without leaving any

guard to watch them. This carelessness is possible because nature has provided peculiar safeguards. The exit towards Tibet is full of heavy snow, and there is only one road of access, upon which the intermediate base is situated. Two or more similar trips are necessary for the transport of the whole of the merchandise to the highest base.

As soon as the transport of the goods is completed, preparations begin for the larger and more difficult migration, when the entire family migrates with cattle, bag, and baggage. It is a more troublesome business, though it offers a spectacle full of interest and beauty. Whole villages are seen on the move, with women and children, old and young, infirm and healthy, cattle and dogs, all on the trek to their summer seats. An auspicious day is fixed by the village astrologer. Usually the villages belonging to the same stock march together. The three or four days before the start are very busy. Both men and women are engaged in packing the goat-bags (*karbozas*) with grain. All the surplus utensils, bedding, and supplies of food have to be sorted and put safely on one side, and the things to be carried up, selected and packed, on the other. A Bhotiya courtyard piled up with stacks of *karboza* will tell the most superficial observer that the migration is imminent. The goats and sheep start a day earlier, with the shepherds, but the other pack-animals—the ponies and *jibus*—accompany the families. In the small hours of the morning the beasts of burden are carefully loaded. An insecure load means loss in transit, and much inconvenience to the man in charge. Directly the loading is over, the women and children set out. The head of the family, or the leader of the caravan, leaves last of all. He has to load the ponies and *jibus* and lock up the house, looking carefully to ensure that nothing has been left behind, that everything of importance has been packed and dispatched.

The march starts at four in the morning. The children in arms are carried on the women's backs, in a cylindrical *ringal* (hill bamboo) basket, which serves as a perambulator. Those a little older are tied on to the mother's back, and are carried for long distances in pick-a-back fashion, tied on with some article of clothing which confines their arms. Women without young children carry a small *doka* or back-pack basket, which may contain wine, brooms, pots and pans and cups, with such things as are liable to breakage, and a sickle, all

of which are required in the intermediate temporary camps. Besides the *doka* or back-pack basket a small hand-basket (*functa*) is carried by the women. In this are packed the tiffin, toilet articles—comb and oil-flask—medicines, butter, a hand-spindle (*katua*), and wool. These last two articles are indispensable, owing to the industrious character of the people, who invariably spin as they plod along with the caravan.

The whole party, after covering perhaps 3 to 8 miles, according to the strength of its members, halts about nine o'clock at some conveniently level spot. The sites of the camping stages, all of which lie within the marketless area, are determined by their level surface, conveniences for watering, and sufficiency of grazing for the animals. Here the tent (*tarkeb*), which weighs only 7 seers (14 lb), and can be erected in three minutes, is pitched by means of poles which are improvised on the spot. It can accommodate a family of five. The richer families use the *tambu*, which is more elaborate and heavier, and more roomy. It has its special poles, which have to be carried. In an encampment of forty to fifty *tarkibs* only four or five *tambus* will be seen. The poorest class of migrants seek shelter in the cavities of the rocks (*udyar*).

While the tent is being pitched one or two members of each family are sent in to the neighbouring jungle to gather fodder and fuel. The fodder is usually gathered by the women and the fuel by the men. Another set of men unloads the beasts and carefully stacks the double packs (*karboza*) in one corner of the camp. The animals after being unloaded are sent to graze in charge of a young boy. The women now arrange the more costly goods inside the tent, and prepare the food. There is no such specialization of labour if the family is small, in this case all the tasks are performed in due succession by the same set of people.

All these tasks are finished by about noon. All are now served with food—men, women, and children sitting together and sharing the same dishes. After the meal is over the same round of tasks begins anew, the shepherd goes to the jungle, and the women prepare for the evening meal. At four o'clock tea is drunk, with fried meat and fried flour (*latu*). Before sunset all those engaged in outdoor duties are back in the camp. At sunset the larger animals—the *jibus* and

ponies—are tethered to the owner's tent-pegs and given fodder for the night, but the sheep and goats huddle together in a corner of the camp, without forage, the food they have found while grazing being their only diet. Promptly at sunset the camp fires are lit before the doors of the various tents. Round the fire huddles the whole family, bunched close together under their homespun wraps. The housewife prepares the supper on the same fire, while the men, busy with their pipes, try to get as much warmth from the flames as possible. There are no lanterns or candles, the only light is that of the camp-fire. Supper is served about eight, and before nine every camp fire is extinguished. During the night not a sound is heard, save the fierce barking of the lion-like dog, which is left outside in all weathers.

Next morning, about four o'clock, the temporary colony, so tidy and orderly a few hours earlier, is seen to be in utter confusion. The tents are struck and lying in their several pieces, and the goods all strewn about the camp. The slow-moving flocks of goats and sheep, which require but little time for loading, are the first to be sent away. But the rest of the animals, which remain waiting among the ruins of the tents, are marched off as soon as they are loaded. This daily routine of loading, unloading, and making a new camp continues until the summer habitations are reached.

On reaching the highest Himalayan settlements all the animals, carriers and otherwise are sent in charge of a few herdsmen to the *bugyal* (pastures). Thousands of animals graze here day and night, generally remaining in the open. The herdsman erects a crude chalet-like stone shelter, and passes the nights within it, wrapped in a single blanket. But sometimes the flocks are secured during the night as in some well-known annual resorts where there are byres or shelters, carefully built of dry stones, with only one door which is made as small as possible—a precaution to exclude the leopard, which breaks a door if it is large by simply leaping against it.

In the midst of these scattered folds and chalets the shepherds may be seen tending their sheep and goats. Like his Bolivian brother, the Himalayan shepherd "scans the whole countryside for good pasture, drives his flocks for days through little-known lofty valleys, and only returns when his supply of food is exhausted or there is herbage once more upon the over-grazed range near his habitation.

He is a great traveller, and in consequence knows the mountain ways intimately. It is a constant marvel to see to what altitude the Bhotiya climbs, and what out-of-the-way places he reaches. Amidst the bleak slopes in some high valleys there is a widely scattered flock of sheep and goats, and a solitary Bhotiya youth is seen whistling and chuckling to his vagrant flock, and industriously spinning wool as he trots along.¹ At intervals he is heard shouting the lambing news to his fellow-shepherds on the other side of the valley. He has his own code of signals, which his companions alone can understand. He is an excellent and fearless guide, who knows his country thoroughly, and is quite accustomed to climb altitudes which would unnerve the ordinary man. He merely smiles at dangers. He is often recruited from among the poorer Bhotiyas. In addition to a cash payment, he receives a portion of the wool of the flocks which he tends.

The pack-animals are taken back to the trade depots after a fortnight or a month's grazing, and packed again for Tibet. In this short interval of grazing, the jaded horses and the weary flocks revive in a marvellous fashion.

The interval during which the beasts are grazing is utilized by the Bhotiya families in collecting and storing fuel, which is a very difficult problem in these pasture zones. The adjoining forests are assiduously preserved, and there are no fuel trees to be found near the residences. It is a curious law of nature that where there is the greatest need of fuel the least facilities for procuring it are present.

The further marches into Tibet are undertaken immediately the passes are open—that is, about the end of June—and the first batch of traders crosses the British border-line between the 1st and the 15th July. The migration into Tibet is attended with more ceremony than the other marches. The emotions of fear and suspense are unmistakable. The march is usually undertaken after the *Haryala* festival is over. The night previous to the departure is spent in the worship of the gods, in preparing rich dishes, and providing rations for the journey. Tibet, being a bleak and barren country, affords very meagre facilities for the provision and cooking of the daily meals. Hence, to insure against starvation, such a provision of cooked food

¹ J. Brunhes, *Human Geography*, pp. 495-6



A BHOOTIA ENCAMPMENT DURING THE ANNUAL MIGRATIONS



A KHAMBYA CAMP IN THE SUB-HIMALAYAS

With a pitched-out tent and the women weavers

is made as will last throughout the march, and will not deteriorate by keeping. The principal rations are parched rice, flour, boiled meat, and tobacco. Next morning all the men, women, and children march off together to the accompaniment of music. The women and children accompanying the departing traders escort them as far as some watering-place, whether spring, stream, or pond. In the case of Joharis the watering-place lies a mile from the settlement, and here they have erected a temple. The final scene is pathetic. Every man bound for Tibet clasps his dear ones to his breast, and all the women and children are in tears.

Tibet does not enjoy the blessings of an efficient system of government, and has no police. The difficulties of life in such a barren and inhospitable environment have made robbery systematic, especially along the trade routes. The bandits find, in the goods of the British-Indian trading parties, all the necessities of life, and the things they most value, they are raised into activity when the Bhotivas enter the country. To protect themselves against the robbers the parties of Bhotiya traders unite and travel in well-armed bands of fifty or more. The flocks also are united, and the joint caravan will sometimes consist of many hundreds of sheep, goats, ponies, *jibus*, and mules, presenting a striking contrast with the background of the arid and desolate landscape.

Usually two trips to Tibet are undertaken. The first is over by the end of July, and the flocks return with wool, rugs, and skins. Much of the spinning and weaving work in the highest habitations awaits the arrival of this wool, which, when brought to the village, is cleaned and spun by the women-folk. The second trip usually is finished by the end of August or the beginning of September, the bigger traders remaining in Tibet as late as October. After a fortnight's rest, preparations are afoot for the downward marches, and by the end of October the sites are completely deserted, all activity being transferred to submontane bases.

When the families are settled in their sub-Himalayan residences the Bhotiya traders undertake further trips, this time to the Bhabar markets—for example, Ramnagar and Haldwani—passing through Almora or Ranikhet, the richer traders paying one visit to some large centre, such as Delhi, Amritsar, Cawnpore, Calcutta, or

Bombay Between September and April two trips are usually made for the Bhabar markets, where all the wool is disposed off.

The necessity of these frequent marches has moulded not only the habits of the Bhotiya nomad, but also his equipment. His baggage consists of bare essentials, which must be easy to pack. His cooking utensils are a set of mixing bowls, the diameter of the outermost bowl being about 12 inches. His other utensils also can be "telescoped" and packed into a small space. Ease of transport and portability determine every item in his equipment. He has a number of sheepskin and worsted bags, inside which everything is packed—food, utensils, and merchandise. And once the luggage is reduced to a number of packed bags, it becomes very easy to load and unload it.

The barren and difficult nature of the country through which he passes forces the Bhotiya to carry his own commissariat with him. His provision of food runs short at times on account of some unforeseen emergency, and he has to endure hunger and thirst. His camping-grounds are so arranged that there is hardly any third place between the two camps where he can encamp comfortably and obtain the first necessities of life. Hence the march has to be carried through, in spite of rain, wind, and snow. His powers of physical endurance are unsurpassed. His whole march consists of a series of strenuous climbing exercises. He is well practised in riding, walking, and carrying loads. He is a trooper, a soldier, and a scout, all in one.

Often during the progress of the march he has to face sudden emergencies, which compel him to be self-reliant and self-possessed. Such, for instance, are accidents among his baggage animals, owing to bad feet, or to their going lame as a result of the difficult track. In such cases prompt action has to be taken, both to relieve the animal of its burden and to provide a safe and slow escort for it.

His daily association with different types and tribes of people, and his passage through different territories, subject to different governments, make him friendly, good-tempered, and hospitable. He is witty, shrewd, and always genial.

He is accustomed to travel through rugged mountain wildernesses without the use of maps, and has thus developed a keen sense of direction, he seldom loses his way. Whenever his sense is at fault, as in a blizzard or in darkness, his animals come to his rescue, they

always keep to the track, if once they have passed that way. He is honest, singularly courageous, in spite of his superstitions, loves his home, and is cheerful under difficulties. He is a great traveller, and year after year goes not only to the distant and inaccessible Tibetan markets, but also to Cawnpore, and even as far as Bombay and Calcutta. He keeps in touch with the great currents of thought and feeling, unlike more stay-at-home mountaineers, but he has little leisure to study them. Like the Kurds and the Gilzaes, he is not a nomad in the strict sense of the word, and for lack of a better term he is classed among the semi-nomads.

In addition to these Bhotiya migrations, there is a similar migration of Tibetans to the lowlands of the district. These Tibetans belong to the Khamba tribe, and are popularly known in the district as Lamas or Huniyas. They live chiefly in Taklakot, but a few families have settled also in Khimling, Purang, Bidang, and Garbyang in Darma, and Gurguni in Niti, but these are mere camping-places, no agriculture being carried on there. They are divided into the Run-Khambas and the Dulba-Khambas. The former follow more or less the same occupation as the Darmi-Bhotiyas. The men act as middlemen, and the women work at the looms. The Dulka-Khambas are beggars, and not particularly honest.

During the summer the Run-Khambas trade in Tibet, but during the winter they disperse throughout the Kumaon division, from Dharchula to Ramnagar. Unlike the Bhotiyas, they are always accompanied by their women and children, and the whole family migrates. They have light, dirty tents, which they pitch near a village or in the vicinity of an urban area. The women and children work at their looms, while the males go out and sell their goods in the urban centres. They generally have a few small bags full of *jambu*, a kind of scented grass, which the people of the lower levels use as a spice. This they sell for cash or exchange for grain. In the evening their camp presents a very picturesque scene. A fire is lit, and round it sit young and old. The housewives prepare their peculiar meals, and one of the men infuses the tea, adding butter and salt to it. The pack-animals, which are left in the jungle to graze, are brought into the camp, and tethered by one fore-leg tied to a picket, a definite place being allotted to each animal. Generally they encircle the tent on

three sides, and outside the circle a sheep-dog is tied. The animals, after they have been tethered, are re-equipped with their trappings and their bells, which were removed when they were sent out to graze. The whole impedimenta of the Khamba consists of a few worsted or sheepskin bags, a few ropes, and some kitchen utensils, like a set of mixing bowls of wood or metal, the diameter of the largest being 6 to 8 inches.

Recently the migrations of both the Bhotiya and the Khamba have shown a decided tendency to decrease in volume. A smaller number of Bhotiya families now leave for the highest habitations, and fewer traders cross the Tibetan border. New ideas of comfort are gradually influencing them. The self-sufficient nature of the mountain economy is breaking down. The merchant and the commercial traveller have approached even the higher habitations. The advent of motor coaches, and their penetration to the outlying parts of the district, and the introduction of new and cheap luxuries, have greatly modified the Bhotiya's mode of living. His homespun national costumes no longer find favour as compared with cheap woollen and cotton fabrics. Swedish and Japanese matches are displacing the steel and flint. The portable primitive tent is superseded by the more modern and elaborate Cawnpore article. Knives, umbrellas, shoes, tinned milk, and coffee, sugar, electric torches, etc., are becoming daily necessities. At the periodic highland fairs the flute and the *hurka* (drum) give place to the modern bagpipe. Even the national songs composed in the Bhotiya dialect are undergoing transformation, and are being superseded by the songs of the city. New ideas travel fast among migrants, and bring in their train some of the disintegrating influences of civilization. The bonds of social control are loosening, and the solidarity of the clan spirit is assailed. Such changes are discernible everywhere, save in the mountain fastnesses, where the physical barriers offer insuperable obstacles to the movements of men and commodities.

CHAPTER IV

THE INDUSTRIES OF THE HIMALAYANS

WHILE the men are engaged in the trans-Himalayan or submontane trips, their women stay at home, either in the higher settlements or in the valleys. Being left alone, and having abundant leisure at their disposal, they have developed a special aptitude for spinning and weaving wool into beautiful and durable fabrics, and also for seeking an ampler life in clubs and guilds. These tendencies have also been encouraged by the abundance of raw material yielded by their flocks, and by their proximity to the Tibetan wool-marts.

His flocks constitute the wealth of a Bhotiya. His survival is entirely dependent upon the goats and sheep which supply him not only with his daily meat but also with his attire and bedding. Their hair and wool is used for the making of tents, ropes, bags, and garments. When alive they are used as beasts of burden and provide him with wool, and when they are dead their hides, furs, sinews, and bones are utilized as household furniture or sold for cash. They are, in short, the Bhotiya's mainstay.

The Bhotiyas generally employ three varieties of raw wool, according to the species of goats and sheep available. For coarse woollen blankets, ropes, and bags, they use the shearings of the cis-Himalayan or Kumaon-bred carrier-goats and sheep. On account of the comparatively warm climate of the cis-Himalayan region, and the poorer grasses of the low latitudes, the fleece is very coarse, dry, and short-stapled, and therefore unsuited for the better grades of cloth. For ordinary medium-grade products, the wool of the *byun*, or the flocks set aside for the propagation of the stock, is utilized. *Byun* are the flocks of ewes kept for breeding purposes only.

The cold climate and the luscious grass make the wool of Tibet highly suitable for finer stuffs. The fleeces of the sheep and goats bred in the trans-Himalayan region are very strong and long-stapled. Hence the Bhotiyas import huge quantities of Tibetan wool, for their own clothes, and for the costlier homespun products made for sale.

For exceptionally fine products the *pushm* or shawl wool is used.

Pushm consists of the underhair of the small breed of goats and sheep found in the elevated regions of Tibet. It is the soft down lying under the long hair of these animals.

Shearing, among the Bhotiyas, is a very crude process. If the fleece is sparse it consists of merely pulling the wool off the sheep with the hands. But if the fleece is thick a pair of scissors or a knife is used. The carrier-flocks are shorn twice a year, once at the beginning of the hot weather, and a second time immediately before descending to the warm valleys. The *byun* flocks are shorn three times, viz. in March, in August, and in October, according to convenience. In Tibet where the cold is intense, there is only one shearing, in July. A well shorn Bhotiya sheep is a most ugly animal to look at.

Wool forms the chief article of import from Tibet, and most of it is sold to the Cawnpore mills, where it fetches a price varying between Rs. 30 to Rs. 50 per maund. In 1923 the total imports of wool amounted to 27,000 maunds. Out of their purchases of this wool the Bhotiyas retain a selected quantity for their own use, from which their homespun products are chiefly manufactured.

After being soaked in hot water, beaten, and washed, the wool is spun, generally by the menfolk, into different grades of yarn. The men alone lead an itinerant life. They are unable to weave during their marches, but they can easily spin. The spinning is done by hand, with the aid of a simple hand-spindle known as *takli* or *katwa*. It consists of a little bamboo stick to the bottom of which a small round weight is affixed. A circular block of wood, 1 to 1½ inches in diameter, is pierced through the centre with a bamboo spindle no thicker than an ordinary black-lead pencil, and 6 to 9 inches in length. Sometimes a copper *pice* serves the purpose of the wooden weight. In recent years a cotton-reel, after the cotton has been used, is employed as a weight. Any novice can manufacture his own *katwa* with an ordinary pen-knife or a sickle. It costs hardly a *pice*. Wool is spun into yarn by twirling the spindle with the fingers, the yarn is wound on the spindle as it is spun. The Bhotiya keeps his spindle twirling all day long, and especially when the flocks are being driven along the roads, or when he is sitting by the fireside. He is always busy with his *katwa* during his marching hours, or when he is tending the flocks in the forest. His assiduity is so great that he walks with

one eye on his laden goats and one on the spindle. He is always to be seen with a skein of wool, which he carries on his wrist like a bracelet, and he goes on spinning even while walking, talking, sitting, or carrying a load.

The yarn spun is of two varieties, viz. single-ply yarn for coarse textures, when the raw wool is spun into yarn by applying torsion anti-clockwise, and two-ply yarn for closer textures, when two single-ply threads are combined by applying a clock-wise torsion. A man can spin as much as half a *seer* in a day if he devotes himself exclusively to the task. But as a rule the daily output of a spinner, if engaged in other work, is a quarter of a *seer*. A child can spin half as much as an adult. There are some 12,000 Bhotiyas engaged in spinning. The yarn, when spun, is not sold, but is woven into fabrics for private use or for sale.

The spinners are also their own weavers. The Bhotiyas will sometimes even weave cloth for the people of Jalla Jolai, Goriphat, Sira, and Danpur, who, as a result of close contact with them, have likewise learnt to use the *latwa* during their leisure hours. But they have not picked up the art of weaving, and therefore get it done by the Bhotiya women.

The Bhotiyas have a great reputation as weavers, and are celebrated throughout the district for their fine blankets (*thulmas*). The male preponderance of spinners is more than counterbalanced by the women weavers. The women, as has already been said, stay at home. They have very little work to do in the fields, since few of them possess any fields in their winter resorts. Their chief occupation, therefore, is weaving.¹

From sunrise to sunset the women-folk sit at their portable *chans* or looms, and weave the yarn into blankets, cloth, or bags. They have acquired so great a dexterity in this art that it has become second nature to them. Their secrets of colour and design have been transmitted from mother to daughter since time immemorial. The women, in addition to being hereditary specialists, have also acquired a very sound knowledge of the treatment, grading, and dyeing of the wools. Their colour-sense is so fine and sensitive that it is almost intuitive.

¹ This division of labour is entirely opposed to that prevailing in Kashmir, where the women spin and the men weave.

Out of a total population of 13,744, as many as 11,500 are engaged in the textile industry

The looms are simple and primitive, consisting of ten or twelve small sticks and a few cords and leather straps. The wood is very light, and the only iron employed is a blunt implement which is used to press cloths of close texture. The whole loom does not weigh more than three or four seers. There are two types of these looms. The type most commonly used falls under the category of the throw-shuttle loom, with a certain peculiarity characteristic of the Bhotiya loom. It is found in all the five valleys. The second one, with a space to accommodate the weaver, is found in Milam only.

The warp is set by driving six or more pegs into one end of the loom and five or more pegs into the other. The *sine qua non* is that at one end of the loom there should be one more peg than at the other. The yarn is stretched between these pegs in a zigzag fashion.

Weaving is always performed in the sunshine, in the open courtyard. Whenever the heat becomes unbearable to the weaver she protects herself against the rays of the sun by means of a cloth canopy or a leafy bough. As a rule, the women of a particular group of houses have a special courtyard where they set up their looms, and so the weaving is done in company, the women gossiping and singing as the work progresses. In Darma and Byans this guild life is more developed. There one finds special weaving yards or platforms (*ranth*, as they are called), where all women and girls of the neighbouring houses assemble and set up their respective looms. Often as many as twelve or fifteen may be seen working in one *ranth*. It is usual for girls of the same age to flock together. The Himalayan woman has come to regard weaving as her monopoly, so much so, that in Johar, if a man is found weaving, he is fined by the girls of the locality, the fine being paid without demur, in drink or in money. The first lesson that a girl in these valleys is taught is to make her own garments, which, in the case of the women of Darma and Byans, consist of tubular sleeveless frocks. They are dyed either dark blue or red, with white stripes. But the Johari girls make only the *kamila*, which they wear as an outer garment above the cotton skirt. It is always of black Tibetan wool. Specially selected and high-grade wool is used in all



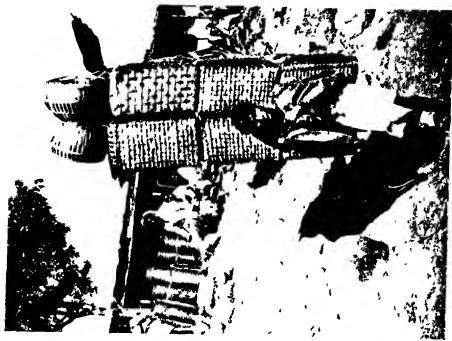
SPINNING IN A HILARIOUS COMPANY
Byansi girls busy with their spindles (Not their homespun garments)



SPINNING DURING THE MARCH



KHAREWATING BY A NIPMUNI PORTER



BYSKETS, KILTS AND MATS

What to see at the Bysket, Kilt, and Mat Sale

these garments, and special requests for such wool are made to the men of the family on their departure for Tibet.

Throughout the Kumaon Himalayas it is only the simple women-folk of Darma and Byans who have preserved their old, picturesque costumes. The Johari women have assimilated the culture of the ordinary hill-women, and dress, like them, in cotton fabrics. But among the Byansi and Darmi girls the love of homespun is so deeply rooted that a girl will even weave her own *am lugara*. *Am lugara* is the woollen pall which is fastened to the bier of the dead among the Bhotiyas of *pargana* Darma. In the case of the men, it consists of a length of cotton, but for women it is always woollen homespun. The produce of the looms, after meeting the family requirements, is sold, and the money realized is left to a great extent at the disposal of the women-folk.

Among the principal articles manufactured by the Bhotiya women is *pattu*, a coarse woollen serge. The width of this serge is about the length of the forearm. It is not made wider, because that would mean a little more exertion for the weaver, as she would have to stretch her arms more widely. Moreover, the looms are adapted to this width, and the women have been accustomed to this size for generations. Of this rough serge the clothes and gowns (*bakus*) of the menfolk are made, and if there is a surplus it is sold. The yarn used is of the finer Tibetan wool. Eight or nine yards generally constitute a piece, and a piece requires three to four seers of wool. The piece, when sold, fetches from Rs 6 to Rs 10. Pieces of unusually fine texture and colour fetch an even higher price. *Pattu* requires more time to weave than other fabrics, as it has a very close texture.

Barely two yards are woven in a day.

Thulmas are thick woollen blankets, either white or black, according to the natural colour of the wool. They are manufactured in the same way as the cloth for the *pattu*. Three or four breadths are afterwards sewn together to make the blanket. After weaving it is fluffed and then combed. Combing is done with sharp bamboo needles, fastened together like a broom. This is a very delicate task, and the value of the blanket depends on the successful results of the combing. Only very skilled operators undertake this work. Usually six to eight days are required for the manufacture of a *thulma*. Some six or twelve seers of

wool go to the making of one blanket. The black *thulmas* are more costly, and sell for Rs 12 to Rs 35, according to the uniformity of combing, the gloss of the wool, and its quality and weight. The white *thulmas* are sold for Rs 6 to Rs 16. The Johari Bhotiyas excel the people of the other valleys in combing and weaving this type of blanket.

Pankhis are coarse, warm woollen wrappers. They are seldom coloured. Two to three widths are stitched together. Sometimes they are of single thickness, sometimes of double. Two-width single wrappers fetch from Rs 3 to Rs 7, and three-width double ones up to Rs 14. They are lighter in weight and cheaper than the *thulmas*, and are generally used by the middle-class men and women of Almora, who cannot afford the costlier products. One single-sheet wrapper can be manufactured in three days.

Chutkas are thick coarse rugs with long hair (2 inches in length) loosely woven in the midst of the yarn. The hairy side looks like the fleece of a goat, and the other side is plain and even. The size is similar to that of the *thulmas*, but the price is somewhat lower. The yarn is first washed and then woven. The price varies from Rs 6 and Rs 20. They are usually woven by the Darma and Byansi Bhotiyas.

Dans are small pile carpets, usually the size of a dressing-table. These carpets are embellished by designs in various colours. The Bhotiyas successfully copy the Tibetan designs, which are interesting and consistent, but, unlike the Tibetans, they fail to match the colours. The yarn is washed and dyed before weaving. Formerly the dyes were prepared with vegetable products found in the region, but recently aniline dyes have begun to replace these natural dyes. The *dans* are used for spreading over larger carpets, and for sitting in the sunshine during the winter. They are articles of luxury, and fetch from Rs 10 and Rs 20 per pair.

Asans or prayer rugs are generally square. Their length is just half that of the *dans*, and in design and weave they follow them closely. They are used by the hill people as prayer carpets, and cost from Rs 3 and Rs 6 per pair.

The *karboza* is a small saddle-bag, consisting of a pair of woollen pockets, which is used as a pack for transporting goods on the backs

of goats and sheep. The wool used in these bags is that of the Kumaon-bred flocks, and the yarn is doubled before weaving. The cloth requires extremely hard pressing, and is very closely knit. It is woven during the warmest part of the day, between 10 a.m. and 2 p.m. Usually one yard a day is woven, and this suffices for one bag. Similar but more artistic bags are also made for the women, who use them as handbags, in which articles of daily use are kept—such as knives, spoons, needles, steel and flint, tobacco-pipe and pouch.

The Darma and Byansi Bhotiyas of both sexes often wear woollen boots (*Lum*) reaching up to the knee. These are embellished with very artistic designs, woven in various colours, and sewn chequerwise. They are soled with rope or hide, very finely plaited. Their price ranges from Rs 4 to Rs 6.

Chuntas are the very coarse inferior blankets used by the poorer classes. They are smaller than the *pankhis*, and their texture is very coarse, as only inferior wool is used. The price varies from Rs 2 to Rs 5.

Occasionally, as in Kashmir, the *pushm* wool is woven into fine, warm shawls, which fetch from Rs 20 to Rs 60.

Nearly all these manufactures undergo the process of fluffing, which consists in dipping the fabric into boiling water, treading it with the feet, and beating it with a mallet. Sometimes, instead of dipping it into hot water, the wet fabric is spread over a hot stone with fire burning beneath it. By this process all the tiny little holes are filled, and the fabric becomes more impervious to air.

The markets for the disposal of these manufactures are so arranged and adapted to the environment as to cause the least inconvenience in transit. Thus the goods prepared in the highest habitations are sold at the annual fair of Jouljibi which lies on the downward route, thereby effecting a saving in transport charges. Those prepared during the winter are sold at Bageshwar or Thal, the markets nearest to the winter resorts.

The male residents of the Himalayan region of Doti in Nepal, who work as porters in the sub-Himalayan markets of the district, utilize their leisure hours in weaving a kind of haversack or *khari*, which is very convenient for keeping handy and necessary articles while on the march. In weaving this a reel is fastened to a T-stick,

and round the reel are tied the main threads of the warp. The weaving is done with a needle. The *khari*, when made, is carried over the shoulder. Usually an hour a day is devoted to weaving it, and the finished article is ready in about a fortnight. It sells for a rupee or two. This is the only weaving performed by the men among these highlanders.

The low-caste Bhotiyas (Bajelas), and the inhabitants of the upper villages in Danpur, make baskets and mats of *ringal*, which is found in abundance in the upper and middle Danpur forests. *Ringal* is a variety of small bamboo, which should be cut when it is leafless. This is its natural state in the winter, and hence throughout the cold season, and to a certain extent even during the summer, the people of Danpur are engaged in the collection of this raw material. Of recent years extensive cutting, both for the sake of the raw material and for grazing purposes, has exterminated the *ringal* (*Arundinaria falcata*) in many places, and the people inhabiting the lower portion of the country are finding great difficulty in obtaining it.

The mats are woven by hand, as are the cane mats of the plains. The only instrument used is a knife with a handle at each end and a blade of 6 to 9 inches in length. Sometimes even this is dispensed with, and the ordinary sickle is used. Excellent mats are turned out, suitable for covering floors and for other purposes. They are beautiful, and at the same time cheap and durable. The ordinary hillmen call them *mosta*. They are in great demand in the paddy-growing valleys, as the whole process of threshing and winnowing is carried out over floors of matting. There are two varieties of mat, according to the quality of the *ringal* used. The *nakuri* or white mats are slightly inferior, and cost from 8 annas to Rs 2 8, according to their length. The Danpuri mats are rather greyish in colour and are considered to be superior. They cost between half a rupee and Rs 4. Some 20,000 mats are sold in the annual fair at Bageshwar.

Pitars are the rectangular baskets used for storing more costly articles. They are generally fitted with hinges and a lock, and strengthened with a covering of deer-skin or tiger-skin. They are exceedingly popular all over the hill country, and are used instead of wooden boxes and steel trunks. They are employed also as auspicious suit-cases (*byol pitar*), for conveying the bride's ornaments and her

best dress from the bridegroom's house, whenever a marriage takes place in the hills. The comparative ease with which they can be carried over the difficult hill-paths, owing to their light weight, may perhaps have determined this choice. There are two varieties, viz. single and double, according to the weave. The quality of the article depends on the skill of the individual worker. It often happens that a weaver attains a widespread reputation, and his wares are known by his name, e.g. the *pitars* of Lachmua Nakuri. About half a dozen sizes are made, and the cost varies from 4 annas to a rupee. The skin-covered *pitars* are sold for Rs 5 or more.

Besides these *pitars*, nearly 50,000 baskets of every size and form, from the widely used *doka* or *dala*¹ down to the smallest basket used in gathering flowers, are made and sold at Bageshwar. With a little effort their manufacture could be made a flourishing industry. The workers, if given a little instruction, are capable of great neatness and finish, and can turn out baskets of the best and latest designs, equal to those of Japan or Scotland.

Another small industry is the manufacture of wooden vessels, which are turned out of a single block of wood. The lathe is driven by water power. The turner must be physically very fit, as the work requires enormous strength, and it is usual for the men to work in shifts or relays. This industry is established only where good timber is found in conjunction with ample water power—for example, in Gorichal (Askot). It has been handicapped recently owing to the dearth of suitable timber. The wooden vessels are in great demand throughout the district, especially by those engaged in dairy-farming.

We see that both the weaving and the turning industries are in a high degree adapted to the resources and requirements of the mountain region. The raw material, wool or timber, is the product of the region itself. Wool, as we have seen, is available from the shearings of the flocks, which are so extensively reared, during the summer months, amidst such ideal conditions of pasturage. It is also brought from the immediately adjoining province of Tibet, so well known for its better grades. This advantage, combined with the industrious nature of the

¹ The *doka* is used in the more northern parts, and the *dala* in the southern parts of the district, for carrying manure, field crops, grass, and other agricultural products.

people, and the ample leisure of the nomad life, makes the region eminently suited to the industries of the household stage of culture. Nowhere else in the district is such a combination of advantages as regards raw material and human aptitude to be found. Nowhere else have the industries attained such stability and become so inextricably interwoven with the whole texture of domestic and social life.

CHAPTER V

THE SUB-HIMALAYAN OR THE ALMORA REGION

THE tract south of the high mountains and glaciers is known as the sub-Himalayan or Almora region. It lies to the south of the line drawn between Askot and Kapkot, and consists of innumerable ridges and valleys. Each of these ridges is connected with the others in a more or less indirect manner and culminates in a snow-covered peak. Each valley is a stream-bed leading down into a larger valley. The numerous streams, as they descend, lose their independent existence, joining some of the tributaries of the great rivers of northern India, e.g. the Sarda or the Ganges. Generally speaking, there is in every ridge a central range about 8,000 to 10,000 feet in height, and the numerous offshoots from it divide the tract into smaller valleys, through which the drainage of the tract flows into the larger rivers. The higher and the northern slopes of the ranges are covered with oak and rhododendron, and the middle slopes and the offshoots with pine. As a rule the southern portions of these ridges are gentle in slope and of low altitude. The beds of the small streams open out into wide and fertile glens, unencumbered by forests, with excellent facilities for irrigation and fine alluvial soil. But occasionally the river beds are enclosed by lofty and precipitous banks. The valleys, in such cases, are very deep and narrow, and their climate sultry and suffocating, e.g. the Kali in Kali-Kumaon and the Gori in Gorichal (Askot).

Wherever the topographical conditions, as regards sunlight and water supply, are favourable, cultivation is carried on very successfully. But owing to the nature of the country it cannot be carried on continuously from end to end of the ridge or valley. Hence it is found in patches, in scattered blocks, divided by intervening ridges and ravines. The uncultivated portions are occupied by bush jungle or forest, or by steep, bare ridges, unfit alike for forest growth or cultivation.

Cultivation begins from below, along the banks of the rivers, and extends uphill as the population increases. From the series of irrigated

fields on the river bank, it spreads to patches of level alluvial and unirrigated areas above the river bed, and finally reaches the gentle slopes and ridges, which do not admit of cultivation without terracing.



THE TWO NATURAL REGIONS OF THE DISTRICT

The composition of the soil is not so important as configuration, drainage, irrigation facilities, and sunlight, which are the physical factors determining the hill cultivation. The height of the slopes determines the area which will be cultivated. If the slope of a ridge is gentle, it is generally found to be under terrace cultivation, which

is almost continuous from the banks of the river to the top of the hill. An abrupt gradient not only multiplies the cost and labour of terracing, but also makes the land liable to constant soil erosion by rain-water, and hence unsuitable for cultivation. If the slope is gentle it will be cultivated, no matter whether the soil is silt or loam. It is the comparative absence of steep gradients that has made the northern slopes of the Almora hills so fertile and so pleasant in appearance. Their gentle slope is largely responsible for the richness and depth of the soil. Such soil retains moisture, and the gentle slopes are terraced at little cost. A gentle slope also facilitates the transport of manure, etc., and makes for short communications.

Cultivation here, as elsewhere, is pre-eminently a question of water, and irrigation facilities are therefore the deciding factor. The most inferior land near the river, consisting of sand, gravel, and boulders, is more valuable, if capable of irrigation, than a highly manured, stoneless loam on the hill-top. Irrigation here not only supplies moisture, but, owing to the peculiar method of flooding the land with flowing water, it also enriches the soil with a valuable silt, brought by the river from its upper course, which constitutes an excellent top-dressing.

In the hills the question of temperature is as important as that of humidity. It generally happens that one side of the ridge is sunny and the other shady. That aspect of the ridge where the rays of the early sun strike first is known as the sunny side, and the aspect where they are late in arrival is called the shady side. Like the Catalan, who speaks of the *sola* (sunny side) and *ubaga* (shady side), the sub-Himalayan agriculturist also has his corresponding terms—*tailo* and *saylo*—for the sunny and shady sides respectively. The *tailo* is cultivated from end to end, but the *saylo* or *ubaga* is seldom cultivated, and only when the *tailo* has been fully utilized. The yield of the *saylo* is far below that of the *tailo*. But if the *saylo* runs to a greater altitude, the amount of sunlight is increased, and the difference in yield diminishes accordingly.

Some hills are naturally moister than others. These are always cultivated, even if the initial cost of terracing is high, because in the long run they prove to be profitable.

The quality of the soil, though a minor factor in determining the

agriculture of the hills, is not entirely negligible. It varies according to the nature of the rock found in the ridges. In the valleys it is generally an alluvial loam, full of detritus brought down by the mountain streams. The level lands above the river beds are of loam mixed with gravels. The gentle slopes are either sandy or argillaceous, according to the aspect. Newly broken surfaces consist largely of stones, which decrease with the lapse of time as cultivation improves.

Near the hill-top the terraces terminate and the forest land begins, which serves as the grazing ground as well as the fuel reserve for the villagers. The timber trees and grasses in these forests vary according to altitude and locality. In this region conifers, rhododendrons, and oaks clothe almost every ridge and valley. The pine is the commonest tree of all. It flourishes best between the heights of 3,000 to 6,000 feet, which, as we shall presently see, is the average altitude at which most of the cultivated lands and villages of this region are found.

The villages are as a rule situated on spurs running from the middle and lower levels of the ridges, in the midst of the cultivated fields. Such sites are neither too hot and damp, like the low-lying land near the river banks, nor too cold, like the hill-tops. They are well-drained, elevated, and healthy. Another consideration in determining the village site is the supply of drinking water. The village is built, as far as possible, on the same level as the water supply. Often, however, water is brought down in a conduit from some adjoining hill-stream. Sometimes a spring suffices to meet the village requirements. In cases of scarcity a cistern is built round the spring, and the water is allowed to collect. The situation of forest land is also kept in view. As a rule, it is conveniently situated in relation to the village site—neither too far for grazing and fuel, nor so near that the wild animals are likely to alarm the villagers. On the one side the village has access to good forest land, and on the other to the level irrigated fields in the valley-bottom.

The villages generally are found in a chain. All of those which are situated on a common ridge belong to a common stock, which points to their tribal origin. There is generally a close resemblance in the soil, crops, and houses of the settlements in the same valley. But, strictly speaking, no two villages have the same character. Differences of altitude, gradient, proximity to forest or river bed, etc., give every

village its peculiar characteristics. Each village consists of a strip of the hill-side extending from the banks of the stream to the top of the ridge, where it touches the boundaries of another village.

A typical valley section in this region thus consists of three sub-regions: the upper sub-region is forest and pasture land, the middle dry, gently sloping land cultivated by terracing, and the lower the rich, warm, irrigated fields near the banks of the stream.

The major portion of the cultivated area of these valleys lies between 3,000 and 5,000 feet above sea-level. At these elevations cultivation is most successful, and the area is studded with villages. Cultivation, as a rule, is not found above 7,000 feet. The yield of the crops, and the variety of products, are dependent upon the altitude. Above 5,000 feet there is a marked decline, both in the standard and the output of agriculture.

Owing to its favourable situation and its special features, the region supplies almost the whole population of the district with food. The total population of the district, according to the census of 1921,¹ is 530,338, which figure includes the people of the Bhotiya region. Although it comprises approximately less than two-thirds of the total area, it not only supports the entire population, but even exports a certain amount of food to Western Tibet.

The density and the distribution of the population are determined by the fertile and alluvial valleys and basins of the small tributary streams. The two *parganas* of Pali Pachaun and Baramandal alone—which are distinguished by their numerous rivers—the Kosi, the Sual, the Ramganga, the Gagas, and the Banau—support more than half the total population of the district. Their total area amounts approximately to 900 square miles (500 Pali, plus 400 Baramandal). Of this 108 square miles in Pali and 62.5 square miles in Baramandal are under cultivation. The total population of these two *parganas* is 265,695. The valleys are exceptionally smooth, wide, and open, with excellent irrigation and fine soil. Such, for instance, are the Lodh, Mansari, and Kausani valleys, converging at Someshwar in Baramandal, or the Kothlar and Khetsar glens in Walla, and Palla Giwars in Pali. The two Boraraus, the Tikhuns, and the Syunerass,

¹ The census of 1931 gives the following figures: Total population, 583,302, of which 292,004 are males and 291,298 are females.

comprising together a tract of 7,000 *nahs* (1 *nah* = 240 square yards), contain 37,038 inhabitants. Giwars, watered by the Western Ramganga, contain 23,292 inhabitants, while Katyur, drained by the Gumti and the Sarju, has a population of 24,431.

On the other hand, the absence of a broad river valley accounts for the scanty population and meagre cultivation of other tracts. Thus *pargana* Askot, though its area is 400 square miles, has only 6.49 square miles under cultivation and a population of 19,506. We have seen that the Kosi-Someshwar valley alone contains nearly double the number of inhabitants, and its area is only 350 square miles.

Outside the river basins, among the gentle, terraced slopes, the upper terraces of the central tract of Shor, consisting of Mahar, Seti, Waldivyas, Saun, Kharayet, and Nayadesh, with Chaukots, Kaklasaons, and Doras in Pali, are the best known for their fertility. Shor, "the garden of Kumaon," is so fertile and cultivable because its slopes are very gentle and undulating.

Riuni, near Ranikhet, and Ogalia, near Bhatronjkan, are examples of highly fertile, unirrigated, level lands on the top of the ridge or above the river-level. Their level, stoneless fields, although they are not irrigated, produce bumper crops, hardly inferior to those of the river valleys.

Agriculture, so largely predominant in this region, is by no means easy and simple; it is, on the contrary, an arduous and precarious occupation. Each valley has its own peculiarities, and the population has to adapt itself to these varieties of environment. Ordinarily each village endeavours to feed itself with its grain-crops, the chief of which are *madua*, rice, wheat, and inferior millets. Other crops also are successfully grown. The labour involved in growing these crops is very great, and the cultivator must always be on his guard against the rapid invasion of thorny bushes, such as *ghungaru*, *hisalu*, and *kilmora*. There are several other factors which make cultivation in the hills more precarious than in the plains. Occasional floods, hailstorms, landslips, the extensive ravages of wild animals, and a high mortality among both the people and the cattle, are some of the special obstacles to human initiative and progress with which the hardy hillmen have to cope. Moreover, the actual work of agriculture demands an incredible amount of labour. The hillmen have to terrace whole

ridges, and transport cattle, implements, and manures from distant homesteads. The transport of produce by rough, precipitous paths, from the fields to the homesteads or markets, is also a heavy drain on cattle and man power.

But in spite of all these natural obstacles, agriculture is still the mainstay of the entire population. Its predominance is to be explained by the still more precarious and hazardous life of the shepherds. As compared with the pastoral industry, agriculture, however difficult, affords relatively greater security and comfort, and eliminates the dangers and hardships of periodic movements. As we have seen, out of a total population of 530,338, no less than 489,720 are ordinary cultivators. The following table gives a classification of the major occupations of the district.

Occupation	Number of Males	Number of Females	Number of Dependants
1 Income from rent of agricultural land .	151	89	290
2 Ordinary cultivation .	158,127	172,229	156,422
3 Agents, managers, clerks, and rent collectors	10	—	1
4 Farm servants	852	4	507
5 Field labourers	280	511	257
6 Total ordinary cultivators	159,420	172,833	157,477

This gives an average of 924 persons per thousand dependent upon agriculture. Large proprietors are extremely rare, and, excepting the Rajbar of Askot, there are no *zamindari* estates. The cultivated land is held almost entirely by a body of peasant-proprietors or their tenants. These proprietors are settled in village communities, which exhibit a very strong clan-spirit. So highly developed is the spirit of clanship that people often derive the name of their caste from the villages they inhabit. e.g. the caste-men residing in the village of Masi are known as Masiyals.

No accurate figures as to the size of agricultural holdings are available. It may be estimated that 95 per cent of the *hussedari* or *zamindari* holdings are below 10 acres, and 50 per cent under 3 acres,

and each of these holdings may again be subdivided into separate plots among several persons

Where 90 per cent of the people are agriculturists, we should naturally expect to find that the percentage of the rural population is similarly very large. The number of people living in villages is 911 88 per thousand, whereas the towns contain only 88 12 per thousand of the district population. The mountainous and inhospitable nature of the tract, where transport and water facilities are relatively scarce, and where agriculture is scattered in tiny blocks amidst the ridges and ravines, will not permit the villages to become as populous as in the plains. The total number of villages in the district is 5,093, and these contain the entire population of 530,338.

There are only two urban areas, which contain the whole of the urban population. Of these two, one owes its existence to the fact that it is a cantonment. Both showed a tendency towards decline between 1911 and 1921, but the decade following 1921 has witnessed a recovery, on account of opening of motor traffic. Before the advent of motor traffic, the limited and widely distributed resources of the region and the difficulties of transport rendered the supply of provisions to a large community precarious and checked the growth of population.

	1931	1921	1911	1901
Almora	8,715	8,359	10,560	8,596
Ranikhet	4,745	3,632	5,781	3,246

The mean density of population in the district is 98·4 per square mile. There is roughly one village per square mile. But this average or mean here counts for little. The irrigated area, which is 8·15 per cent of the total cultivated area, contains nearly one-third of the population. The mountainous tract occupying one-third of the total area of the district has only one-twentieth of the population. Density of population does not here vary with the amount of rainfall, because most of the region is mountainous and forest-clad. Although it has almost the highest rainfall in the Provinces (being surpassed only by Naini Tal and Dehra Dun), yet its mean density of population is

almost the lowest (being higher than that of Garhwal only). The density of population is influenced by the gradient and aspect of the slopes, the proximity of the highlands to the lowlands, the facilities for irrigation, and the other agricultural possibilities of the region. With these advantages the density is bound to be fairly high, e.g. in the Someshwar valley. But occasionally the density and the percentage of area cultivated react on each other. As a rule, the physical environment alone controls the distribution of population. The district has in some parts nearly reached the limits of extensive cultivation. The following table gives the percentages of cultivated and cultivable areas together with the mean density of population of the district.

Mean Density of Population	Percentage of Total Area of -		Percentage of Total Cultivable Area			Normal Rainfall
	Cultivable Land	Net Cultivated Land	Net Cultivated Land	Double Cropped Land	Irrigated Land	
98.4	9.6	8.6	89.5	—	8.15	63.93

The population is distributed in the following proportions over the various *parganas*. It will be seen that *parganas* which have excellent river systems have the largest area under the plough and contain the largest and the densest population.

THE SOCIAL ECONOMY OF THE HIMALAYANS

Pargana	Number of Villages	Total Area, Square Miles	Total Cultivated Area, Square Miles	Population	Density of Population per Square Mile	Fertile River Basins	Rivers with Canyons
Pali	1,143	500	108	156,505	313	Ramganga, Gagas, Banau, Deogar	—
Phaldakot	124	40	13 4	11,299	282	Kuchigar, Srount	—
Gaugoli	570	300	42	41,166	137	Sarju and Ramganga, and their tributaries	Sarju and Ramganga
Kali-Kumaon	776	250	61 87	55,569	210	Panar, Ladhiva, and Lohavatu	Kali
Baramandal	1,058	400	62 5	109,190	273	Kosi, Sual, Gagas, Panar, Sai, Jangar, and Mansari	Sarju
Shura	267	160	15	20,498	130	Kalpanigar	—
Shor	365	75	23 59	38,253	540	Chandrabhaga and Kalpanigar	—
Danpur	570	600	44 44	58,212	97	Gunti, Garur, Lahur, and Kanagar	Pindar, Sarju, and Ramganga
Askot	142	400	6 49	19,506	48	Garjigar and Charnigar	Gori and Kali
Johar	213	—	—	15,629	5-10	—	Gori and Ramganga
Darma	52	—	—	4,516	5-10	—	Dhaul and Kali



A VILLAGE SITE
In an irrigated valley



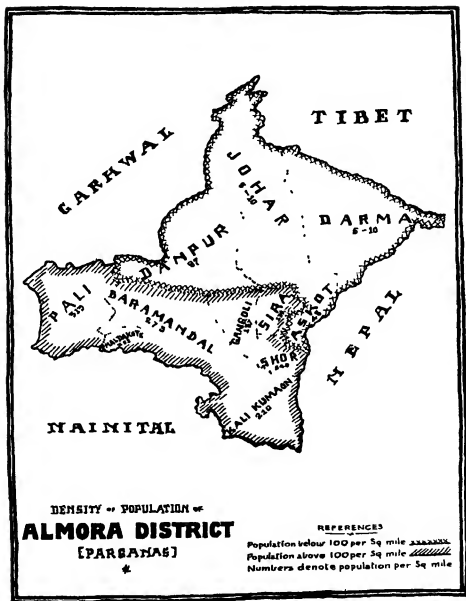
BHOIYA MANUFACTURES



A VILLAGE IN THE FOREST ZONE IN DAMPUR



ASKOT VILLAGE



THE DISTRIBUTION OF POPULATION IN ALMORA DISTRICT

INTERMITTENT CULTIVATION

(KATIL CULTURE)

WE have seen in the last chapter that an ordinary ridge can be roughly divided into three portions, viz the forest, the terraced region, and the irrigated tracts below. The two latter, as we shall see presently, are the tracts in which agriculture is primarily carried on. But in the forest also that adjoins the terraced tracts hill-agriculture in its primary form is found, and this is generally known as *khl* or *katil*.

Katil is the method of cultivating hilly tracts without terracing them. Every year the population is increasing, and the need is felt of providing more and more food for this increasing population. This necessity, coupled with the policy of the authorities, which is to encourage cultivation at the expense of forest preservation, has given rise to this form of agriculture. The right of extending cultivation leads to new lands being taken in every year. The adjoining forest, covered with shrubs and bushes, is cleared and burnt, and the land broken up with the hoe. This method of cultivation roughly resembles the migratory form of agriculture practised by the Fang people in the Amazon valley, or the *tavy* of Madagascar. As by the Fang people, a complex process of tree and scrub devastation is carried on in the forest regions. During the winter, when ample leisure is available, the villagers enter the forest adjoining their fields and select certain pieces of land for extending the limit of their cultivation. Plots near water are generally selected, with good soil and gentle gradients. The plots chosen are then cleared, the mode of operation consisting in felling the timber and clearing patches of *ghungaru* and other scrub. The timber is left to dry throughout the winter, and when dry it is burnt. Sometimes the dead leaves of pine and oak are brought in for burning, in addition to the fuel which is obtained by clearing the site. These burnt ashes are the only form of manure applied to the land. The seeds are then, very thinly, sown broadcast over

these ashes. Occasionally the alternative method of sowing by drilling holes in the ground is adopted. After sowing, the land is hoed or dug to cover the seeds, a spade or hoe (*kutla*) being employed. The plough and other common implements of tillage are seldom used, for one thing, such clearings are often situated on very steep gradients, where the use of the plough would be impracticable. Some ridges are in fact so steep—e.g. in Gangoli—that one wonders how men can work on them. Such land, as we have already said, is never terraced, and a sort of rough "contour drainage" alone is effected. No other labour is required, beyond roughly fencing-in the patches with half-burnt logs and trunks, and watching them occasionally to prevent the inroads of wild animals. Irrigation and weeding are not undertaken, but a regular rotation of crops is followed. After every crop the land is allowed to lie fallow for three or more years. The standard intermittent rotation is of three crops in five years. In some places the land is cultivated two or three times in every twelve years. The vegetation which springs up during these fallow years is cut and burnt again, and sometimes ploughed or dug in. Usually the period of fallow varies, according to the situation of the site, from three to nine years. It is so timed as to allow a sufficient interval for the bushes to grow and re-establish themselves. The land, after a few years of intermittent cultivation, is finally terraced and regularly cultivated. Unlike clearings of the Fangs, such land is never abandoned once it has been cultivated. Such intermittent working is the first stage in the conversion of forest into permanently cultivated plots. The various terms *khil*, *katil*, *kala-banjar*, and *yran* in Kumaon, and *khil* and *kandala* in Garhwal, are all names applied to this preliminary intermittent cultivation of virgin soil destined finally to be turned into terraced lands.

Madua is never sown during the *rabi*, but is cultivated mostly during the *kharif*. The trees are felled in March and burnt in June. When the land has thus been cleared, *madua* is sown. It is the crop most favoured in this form of cultivation, and yields a rich harvest, which is reaped in September. Reaping consists of simply cutting away the ears. Where grass is abundant the straw is left *in situ* and burnt. Where there is little grass the cattle are allowed to graze it.

Chua (*Amaranthus frumentaceus*) is another favourite crop, because it is not easily injured by such wild animals as bears, pigs, and deer.

No manure or irrigation is necessary for its cultivation, and with timely rains a large crop is assured. Like *madua*, it is sown in June.

Other crops grown in these lands are *gahat* (horse gram), *shangora*, and buckwheat. Their chief characteristic is that they can be grown without any care on the part of the cultivator. The sparseness of all these crops is always noticeable, because the seed is very thinly sown.

In some of the virgin plots amidst the oak forests a rich black leaf-mould is found. In such cases the villagers sow the plots with rich crops, like potatoes. Potatoes necessitate very close watching. The least neglect in watching would ruin the whole harvest, since the numerous herds of wild pig are always on the look-out for such delicacies. If saved from their depredations, the land yields a bumper crop.

Haldi or turmeric is often profitably cultivated in these newly cleared lands, since it grows well in inferior soil. The tubers are planted immediately before the breaking of the rains, and collected in November. No wild beast cares to eat it.

In Almora the practice of *dhur* grazing, or transhumance, which is described later on, acts as an incentive to this mode of agriculture. The people have a surplus stock of manure near their *kharaks* (temporary sheds), which they cannot carry to their homelands, since the distance, as well as the difficulties of transport, are obstacles to its removal. They have also ample leisure. They can well tend their cattle and at the same time dig up a small plot of land wherein they can grow some of their vegetables and use some of the manure. The existence of these temporary sheds (*kharkas*) has thus created a demand for this mode of cultivation. *Katil* is invariably found side by side with the *kharaks*. Where there are *kharaks* there is *katil*, but *katil* may be carried on without the presence of *kharaks*.

The chief regions where this form of agriculture is practised to an appreciable extent are Gangoli, Nayadesh (Shor), Kali-Kumaon, and Askot. In Askot, some three miles from Didihat, wide tracts of newly cleared land, covered with tree-trunks lying where they were felled, may be seen amidst the oak forests. Dudatoli in Garhwal, and Bhatkot and Airdeo in Almora, contain many similar plots, cultivated by the graziers.

The greatest defect of this form of agriculture is that it is a for-

midable enemy to forest conservancy, as it originates fires which cause enormous destruction of the slowly accumulated forestal wealth. The beneficent influence of the forests upon soil humidity, as well as their biological and hygienic effects, are thereby lost. In the Himalayas the forests play a most important part in the economic life of the villagers. They provide them with cheap fuel, leaf-litter, humus, fodder, and timber for agricultural implements and dwellings. They also protect them from inundations and avalanches and reduce soil-erosion. They regulate the stream-flow, as has been found to be the case in Switzerland, and protect the rivers which do not rise in the snows from being dried up. The shrinking of such a river as the Kosi, which does not rise in the snows, but which irrigates such a densely populated tract as the Someshwar valley, would cause not only a great agricultural decline but actually sheer starvation. To insure against such a possibility the forests of Bhaktot ought never to be devastated.¹ In fact, there is no reason why the results anticipated by the Japanese forestry experts should not be obtained here, if proper care is taken to preserve the forests. According to Professor Percy M. Roxley, the results anticipated by the Japanese experts are the modification of climate. The trees act as windcreens, and tend to equalize the temperature. They also cause a slight increase of rainfall, since bare rocks check condensation. They prevent or reduce both floods and droughts by checking the rapid draining of water from the hills. Afforestation is considered to be a necessary preliminary to the extensive irrigation schemes which would increase the area under agriculture. Forests prevent the irrigation channels from becoming quickly silted up by the torrential flow of water. Further, they afford increased pasture for cattle and sheep, and by the more even flow and more constant supply of water they increase the supply of fish in the rivers. They purify the air and add beauty to the landscape.

But the people do not seem alive to these beneficial effects. The hillman does not appear to be an efficient woodman. He does not cut the trees, but destroys them. He rings the pine-trees two or three years before felling, so that the tree is allowed to die slowly and shed its foliage. Many acres of fine forests have thus been destroyed. The worst feature of this form of improper felling is that it checks the

¹ Cf. "Give life to the mountains and you will give life to the nation."

natural reproduction of the forests, and thus deprives the soil of the protective covering which prevented its denudation. During the winter months this lazy manner of felling trees is aggravated by the slovenly habits of the Bhotiya and his herdsmen. The flocks graze on the young shoots of trees and the seedlings, with destructive effect.

In spite of numerous floods and droughts, this reckless denudation of the forests is continuously proceeding. In places like Salts the supply of fodder and fuel has become such a serious problem that it is difficult to obtain milk for the children, and amaranthus and chili stalks are used as fuel. Parties of women are often seen travelling miles in search of fuel and fodder, and returning to their homesteads after an absence of four or five days. In well-irrigated valleys—Bansulisera, for example—the absence of a convenient forest has necessitated periodical transhumance in some distant forest.

✓ Outwardly the State seems to be quite alive to these benefits of forest preservation, but as regards its actual policy it is perhaps less enlightened. The policy of making new grants in forest land adjoining the villages has been responsible for the destruction of much valuable forest. The people who actually secure these grants are not the poor and needy, but merely a few grasping individuals who can easily satisfy the lower grades of the State officials. Every new grant in a village means a certain curtailment of the common rights of the village community. Such grants have become a fruitful source of dissension, and are weakening the strong clan-spirit of the village.

✓ Again, the reservation of great tracts of forests adjoining cultivation has greatly harassed the people. The villagers cannot cultivate their holdings successfully, because they are continually interfered with by the ranger and the patrols, and gradually lose interest in their cultivation, as has happened in Kali-Kumaon.

✓ Both forest preservation and the increase of the cultivated area are necessary, but they should be in some way reconciled, so that only the poor and the needy obtain the new grants, and so that the people are not unduly harassed by the forest officials. Care and discrimination in making new grants, and a policy of educating both the public and the low-grade officials who come into daily and direct contact with the people in their respective duties, should go a long way to solve the problem.

But *katil* cultivation has its advantages as well as its defects. The district had only a small amount of cultivable land, and *katil* culture has greatly increased it. Only twenty years ago the district authorities put through a scheme for the encouragement of this mode of agriculture. The defect is not inherent in the system, but in the indiscriminate devastation which is effected in its name. *Katil* lands are always, after the lapse of some years, brought under regular tillage. "Contour drainage" is eventually succeeded by beautiful and regular flights of terraces.

Again, in many parts—e.g. in Kali-Kumaon—it is desirable to get rid of the jungle, in order that many destructive wild animals may be destroyed and cultivation carried on in peace.

In some very hot valleys, like those of the Kali, this form of agriculture is not attended with any evil consequences, as there the vegetation can quickly re-establish itself.

How this tendency has been working in the past is apparent from the following:

Year	Area Cultivated	Area Cultivable
	Acres	Acres
1842-46*	172,912	523,883
1863-73	185,282	810,895
1886	198,059	826,114

* The figures include the area of the three *pattees*, Chakuta, Koti, and Ramnagar, now transferred to the Naini Tal district.

Although this enormous increase in both categories of land may not have been entirely due to *katil* culture, nevertheless *katil* must undoubtedly have contributed very largely towards extending the area of terrace cultivation. The total area of *katil* in the district was as follows:

1872	38,709 acres
1910	55,510 acres

The rapid growth of population owing to the settled state of the country subsequent to the British occupation has in its turn given a great impetus towards increasing the area under cultivation. The

rate of growth of the population will be seen from the following table

	1921-31	1911-21	1901-11	1891-1901	1881-91	1872
Percentage increase	10 0	8 8	15 9	11 8	15 5	1 8
Mean density per square mile	108 4	98 4	97	84	75	65 64

The increase of population, together with the policy of encouragement pursued by General Sir Henry Ramsay, greatly enlarged the cultivated area. In 1872 it was 185,282 acres, in 1901 it rose to 207,864 acres; and in 1920-21 it reached 295,000 acres (net cropped).

Another advantage of *katul* culture is the destruction of agricultural pests. The fires and the clearings disturb the pests, and by their attempts to escape their numbers are enormously reduced. Fire readily and effectively removes the weeds, and makes the manurial constituents more soluble.

The origin of this form of agriculture is, as elsewhere, related to nomadic settlement and primitive husbandry. It is merely a modification of the primitive form of agriculture found among the agricultural nomads. The beginnings of agriculture in the hill country may probably be traced to such clearings in the forest. And as time went on the more gradual slopes and undulating hill-sides among these clearings were permanently reclaimed and terraced for continuous cultivation, until they became the highland villages of the present day.

The *Rajus* of Askot, who are a forest tribe, and inhabit the forests of Chipula, illustrate this clearly. They live mainly on tubers and other natural vegetable foods. And these products of the forest are supplemented by their primitive system of rice and millet cultivation in small forest clearings.

The *Rajus* are a wandering, primitive, aboriginal tribe known in the district as *Banmanus*, or "men of the woods." Their diet consists principally of fish and birds, forest fruits, and the flesh of certain wild animals. They live in temporary huts or shelters, improvised on the spur of the moment, or in caves, and frequently move from place to place. They are omnivorous, like their confrères in Australia.

or Ceylon. They also manufacture wooden bowls for sale. But they supplement the food yielded by the forest with a kind of *katil* cultivation, in which rice and millets are the main crops.

The system has its parallels in various parts of India.¹ The *taungya* of Burma, the *jhum* of Assam and Chittagong, the *dahya* of Central India, and the *kumri* of the Western Ghats, illustrate the same system of intermittent cultivation. Their basic principles are the same, and they differ only in so far as they have been adapted to local requirements.

¹ The hill tribes Miao, Yao, and Lasso of Northern Siam also practise this form of agriculture.

CHAPTER VII

TERRACING AND TERRACES

THE whole of the Almora region is so steep and rugged that it contains very few tracts of level ground. To a man coming up from the Indo-Gangetic plain, the district presents a striking contrast. Instead of the vast expanse of large level fields, an expanse with hardly any ascent or descent as level almost as the sea, he finds here an enormous number of little fields, presenting every variety of size, shape, and gradient. These fields are quite unlike the artificial subdivisions of the wide, level plains, they resemble rather a gigantic flight of steps, ascending from the banks of the stream towards the summits of the hills. These flights of fields are known as terraces.

Terracing is an ingenious method of adapting hill-sides for cultivation. The quantity of land available for cultivation is extremely small in the hills. And even this small proportion requires terracing, for terracing is the only effective means of checking soil-erosion. Now, this soil-erosion is a constant menace to the hillman's agriculture. Every time the rain falls on the mountains (and it always falls in excess) a certain amount of soil is carried down to the valleys, and the already thin surface-soil of the fields is thus washed away for good. Hence, to increase the cultivable area, and to remedy soil-erosion, the mountain-sides here, as elsewhere in the world, have been cut into hand-made fields, rising in a stair-like succession from the base towards the top. In this way arid rocky declivities denuded by rains and floods have been turned into fruitful fields, beautiful orchards, and green gardens. Without terracing agriculture would here be impossible.

The sites usually selected for terracing are the sunny slopes, which often have a southern aspect. In these the sun's rays fall almost at right angles upon the soil, and in consequence of this direct sunlight snow and frost quickly disappear.

Terracing requires two simultaneous operations. The mountain-side, selected for its form and gradient, is attacked with hoe or pickaxe. The stones, as they are dug and sorted, are built into a loose retaining-wall at the lower edge of the sloping strip. The newly broken soil,

consisting chiefly of coarse gravels, is then thrown and dumped against the loosely built stone wall. This has a twofold result. It levels down the upper portion of the strip, and levels up the lower portion, and so produces a plane surface. In this way walls above walls are constructed, roughly parallel to one another, working from the base towards the summit, until the whole slope is terraced.

But it should be noted that the whole ridge cannot be converted into those smiling terraces in a single season. The process of conversion generally covers several years. The surface-soil, as a rule, is very thin on the hill-sides. Below it lie buried stones and gravels, and any attempt to convert the whole slope at one operation would bury the thin layer of soil under these stones. Apart from this physical limitation, the work requires a vast amount of time, labour, and capital, which cannot generally be provided in a single season. The usual method adopted, therefore, is to build a low wall and to excavate a small portion of the slope in the first year. In the meantime, tilth, weather, rain, and diluvium from the hill-tops help to perfect the terraces. After three or four successive years' labour they are completed. But they continue to improve in quality year after year. At every ploughing as many stones as possible are sorted and removed from the fields, and utilized in strengthening the terrace walls. Every year more manure is applied to the terraces, and more attention is paid to their cleaning and cultivation. Thus, after years of strenuous labour, innumerable walls containing level strips of field have been piled up throughout the region, serving not only as protective barriers against soil-erosion, but also providing a means of getting rid of the stones.

The stones for the walls are sometimes found during the work of excavation, but often enough they are fetched from the neighbouring ravines, where they are available in abundance. They are used without any dressing and without mortar. Sometimes huge tree-trunks are employed in addition to or instead of stones, as in Seraghat near Pithoragarh, where *sal* logs have been used for terrace walls. The women and children bring the stones, while the wall is built by the menfolk. Every cultivator is his own mason, and his chief implements in constructing the terraces are a set of hoes, a spade, and occasionally a shovel. The soil is either swept downwards by the spade or is carried down in baskets.

The amount of land reclaimed in a day depends upon the nature of the soil and the gradient of the slope. Generally, on an average slope, as a day's work, the cultivator can build wall 2 yards in length and 1 in height, provided the stones are supplied to him by others. The terraces always vary in length, breadth, and height, according to the form and slope of the ridge on which they are built. The usual width is between 10 and 20 feet, and the length varies from 15 to 80 feet. As a general rule the length of the field decreases and the height of the walls increases towards the hill-top. The average height of the walls varies between 5 and 8 feet, but in exceptional cases it is as much as 20 feet. Usually the wall itself is a foot or more in thickness. The area of a terrace may vary from 60 to 240 square yards. The initial cost of terracing varies according to the area to be reclaimed. It is roughly from Rs. 25 to Rs. 40 for every 240 square yards.

The most wonderful examples of terracing are to be seen in the *upraon*, or the dry lands immediately above the valley terraces.¹ Terraces 10 to 20 feet wide are common in these lands, and in some places as many as five hundred of these terraces can be counted in continuous flights. In some villages there are more than six thousand terraces, and of these some are less than 10 square yards in area. In some very exceptional cases the height of the terrace is as much as twice its length. The *pattis* of Salts, Doras, Kaklasaon, Athaguli, and Nayas in Pali; Gangol and Chalsi in Kali-Kumaon, the four ridges enclosing the basin of Mahar in Shor; and the *pattis* (groups of villages) of Tikhun, Uchyur, Bisaud, and Mahruri in Baramandal, are all terraced uninterruptedly from the base to the summit of the hills. Hardly a square yard of land is allowed to go waste. Even the bare minimum left for grazing is being encroached upon. The whole of the ridge over which the town of Almora is built is similarly covered with beautiful, smiling terraces, hardly inferior to those of Sumatra and Java.

The work of maintaining and repairing these terraces is far more difficult and laborious than their construction. The force of the water during the rains is so great that hundreds of landslips occur every season, and many of the walls and roads so ably and strongly

¹ The *katil* lands are terraceless, and the valleys, though terraced, have only mud walls barely a foot or two in height. The valley terraces are very flat and fertile, but not very difficult to construct, because of their gentle gradient and alluvial formation.

built under the supervision of the trained engineers of the Public Works Department are completely swept away. The least freshet is sufficient to destroy the dry stone walls built by the ignorant cultivator. The pressure of the moist soil above the walls is sometimes enough to overthrow them. The breaking-up of an intermediate terrace means the destruction of the fields immediately above and below it. The terrace wall, when it falls, buries the crops of the field immediately below it. Moreover, the weight on the lower field becomes excessive, and under the increased pressure its supporting wall may give way in turn. A depression is finally created between the fallen fields and the upper terraces, with the result that some of the fields above it are broken up. Whenever the walls give way, the loss in seed and crops is enormous. Usually from 25 to 40 per cent of the terrace walls break down during the rainy season.

The labour involved in keeping these terrace walls in repair is very irksome. As a rule, they are repaired during winter, when the rains have stopped and people have ample leisure. But the more important ones—that is, those nearest the homesteads, or those blocking up the pathways—are repaired at once.

In addition to the danger of breaking down in the rains, the terraces are subject to the invasion of scrub jungle growths, such as wild raspberry, berberry, and *ghingarū*, which re-establish themselves very quickly and profusely, even in the cultivated terraces. These have to be cut and burnt as often as possible.

The work of repairing the terraces and clearing them of shrubs¹ during the winter has become a sort of secondary occupation, for which the hillman does not get any direct return, but which is essential if his main occupation is to be kept at a high level of efficiency.

The *talaon* or valley terraces have sometimes to be cleared of the soil deposited by flooding. During the monsoon season, if the rainfall is very heavy, some of them are covered with the sand, gravel, and other detritus brought down by the stream, and the level of the field is raised. The raised level makes the field incapable of irrigation, and reduces it to an inferior category. In order to restore it to its old level, sledging becomes necessary.¹

¹ Recently attempts were made in the Government Orchard at Chaubattia to find a cheaper and less laborious method of reclaiming virgin lands. Instead of terrace

Thus terracing of the natural hill-sides is by no means an easy task. It requires a considerable expenditure of money and hard labour. Even the work of repair needs money, skill, and perseverance. That the hillman is able to wrest an agricultural livelihood from such a hard and inhospitable environment is indeed an index of his physical vigour, strenuous industry, and resourcefulness.

walls, the Cingalese system of "contour drainage," in which drains are cut round the fields, was introduced, and its results carefully watched. It may have proved 50 per cent cheaper than the system of terracing, but it failed effectively to check the evil of soil-erosion. On the contrary, it showed by contrast that the prevalent method of terracing, which has been evolved by the method of trial and error, is very well adapted to hilly environments, and can hardly be improved upon.

CHAPTER VIII

DRY-FARMING IN THE UPLAND SLOPES

(THE *UPRAON* LANDS)

WE have seen that the *katil* form of agriculture is characteristic of the forest region and of the outskirts of terraced ridges, where the soil is thin and stony and the slopes are steep. As we descend, we meet with permanently terraced but unirrigated cultivation, in what are described as the *upraon* lands. Still lower, when we reach the valley, we have *talaon* agriculture based on irrigation from streams, rivulets, and springs. The different levels of the valley section therefore exhibit characteristic types of agriculture.

Upraon lands, or the upland slopes which are permanently terraced, have three characteristics. They lie at a high level, have no means of irrigation, and are sown with dry crops. In point of safety, they surpass both the *talaon* and the *katil* lands, but in value they are superior only to the *katil* lands. Their quality varies according to the retentive power of the soil, the evenness of the fields, their proximity to the forests, and accessibility of the slopes, nearness to the homesteads, facilities of transport, and their position on the sunny or shady aspect of the ridge. If all or any one of these factors be favourable, the field will belong to the better class. Better class uplands include the *talliya* plots, which are level, alluvial, but unirrigated blocks above the river bed. The *talliya* plots form the buffer between the *talaon* and the *upraon* lands, and are generally full of fine alluvial silt and free from stones. The crops from these plots compare very favourably with the produce of the irrigated lowlands. The best example of such buffer plots is the *Ogalia talliya* in the Naurar glen of the *Kaklasaon pattis*. It consists of nearly forty acres, and is owned by ten or twelve villages. The soil is full of small stones and gravels. It appears that formerly it formed part of the *talaon* lands. According to a prevalent local proverb, the fertility of the *talliya* is the index of the fertility of the valley below it.

Flat, extensive, and open fields lying at a lower level, with no

irrigation, but with ample forests near them, must also be included among the better variety of uplands. They require little terracing, and contain very few stones. Fields which are so situated, and fields which are served by modern means of transport, are economically as good as the *talliya* plots. The cost of cultivating the better class uplands is comparatively lower than in the case of inferior uplands. The total area under this class shows that it is the largest category. In 1901 it was 115,317 acres, but it must have increased considerably during the last thirty years.¹ Inferior uplands are similar in their general features to the better class lands, but they produce less on account of their inferior soil and situation. In 1901, 67,954 acres were classed as inferior *upraon*.

The uplands, like the irrigated plots, produce two harvests. The *kharif* or autumn crop is known as the *chaumasiya khetsi*, and the *rabi* or spring crop as the *huniya* or winter crop.

Madua (*Eleusine coracana*) is the staple crop, and forms part of the *kharif*. It is a hardier plant than rice or wheat, it can adapt itself to a poorer soil and a smaller degree of heat and rainfall, and it requires less care. Fields where paddy and wheat are unable to prosper yield a rich *madua* harvest. Hence the area sown with *madua* exceeds that sown with paddy. The outlying fields and inferior uplands produce, in addition to *madua*, a mixed crop. Such inferior millets as *jhangora*, *kauni*, *bhat*, *gohat*, *rans*, *chua*, and maize are grown side by side with it.

Madua forms the main food crop of the hills. It gives a larger yield than the other crops, and is said to increase in bulk when milled. Though it is less delicious to the taste than wheat, the hillman prefers it because it is slowly digested. He does not feel hungry during this comparatively long period of slow digestion.² These characteristics have led to its widespread cultivation. It is generally grown in *katil* and inferior uplands. The better class *upraon*, and the *talaon*, as we shall presently see, are more suitable for richer crops.

In uplands *madua* ordinarily follows the wheat crop, which is

¹ Figures are available for those years only in which new revenue settlements were made. The settlement of 1901 is the latest in the district. In 1872 the area was only 103,499 acres.

² There is a local proverb which says "*Madua* is the king and wheat the slave."

harvested in April or May. But seed-time and harvest often vary, according to the warmth of the tract concerned. Immediately after the wheat harvest the land is prepared for *madua*. The harvested fields are first covered with dry pine-needles, which are quickly reduced to ashes. Over the ashes, and before ploughing the fields, the seeds of leguminous crops are sown broadcast. *Gohat* (horse gram) seeds are scattered in these unploughed fields towards their outer edges—near the terrace walls—and in the central portion are sown *urd* (rayed kidney bean) and *bhat* (soy beans). When these have been sown the fields are ploughed. They are usually given one ploughing, and then *madua* is sown in the same manner as millet—during a time of day when there is no violent wind to scatter the seeds. This precaution prevents unwise distribution of the seed and local overgrowth of the crop. As a rule, all the moisture of the fields is allowed to evaporate, and the seed is sown when the soil is like dry sand. The seed lying on the newly sown land is covered by simply drawing a bough across it, instead of a harrow. In some places even this crude operation is omitted, and the seed is washed into the soil by the rain.¹ The seeds germinate immediately after heavy rain. When the young plants are 2 or 3 inches high the whole field is harrowed with a harrow (*danyala*) having six wooden teeth, which is drawn by oxen like a plough. This uproots the plants where there is an overgrowth, and the uprooted plants are then transplanted in the vacant spaces. When this has been done the harrow is applied a second time, about a week later, and if necessary the operation is repeated once more.² Weeding is done only when there is an exceptionally heavy growth of the weeds. The task is performed by large parties of women. They scratch the surface of the fields with the hoe, when the weeds are either uprooted or severed from their roots and soon wither. They are gathered into heaps at intervals and at the edges of the fields, and are usually left to rot. To avoid monotony, the *hurkiya bol*³ is sometimes practised.

¹ In some places, e.g. Salts, the seed is first scattered over the unploughed fields and then covered by ploughing.

² In some places, like Falla Salt, rains fall in excess, the teeth of the harrow and the hoe are unable to scratch the surface successfully, and hence the plough-share is used. A thick wrapping of cloth is applied to the share before it is used. This ploughing is done in August.

³ Described in the next chapter, pp. 113-15.

After weeding is over, some care is taken to uproot counterfeits and weakly plants that absorb the nourishment in the soil to no purpose.

In Salts yet one more operation is usual. As soon as the *madua* plants are 6 inches high cattle are tethered in the fields and allowed to graze on the young plants. This results in a sort of pruning, and after the regular rains have set in the grazed plants grow up rapidly and yield a rich crop. The extreme dearth of fodder in this part of the district may have led to this practice.

Madua ripens in October or November, and soon after ripening the ears are cut. A handful of seed produces nearly five seers. The other millets and pulses, collectively known as *kahan*, are uprooted a little later. The fields then lie fallow, and are grazed by the cattle for two or three months of the early winter. *Madua* is always succeeded by a short fallow season.

Towards the later part of winter, i.e. in February, the fallow fields are ploughed in for the next crop, which invariably consists of rice or *jhangora* (*Oplismenus frumentaceus*). This is the first or rough ploughing, which breaks up the surface and admits the air to the soil, though the cultivator's main object is to prepare the field to retain the moisture of the winter snows and the summer rains. The ploughed and broken surface of the soil prevents the water from running off, and nearly all of it soaks into the ground. It also prevents the snow from drifting in the winter winds. If this operation is omitted much loss occurs, the heavy rain, falling on a dry and compact field, carries off the top-dressing and the surface particles, which contain plant food. Ploughing is followed by the first rough levelling with a toothless wooden harrow or leveller, known locally as *maya*.¹ This not only levels the fields and breaks the clods thrown up by the plough, but it also retards the evaporation of moisture from the soil.

Frequent or repeated levelling, harrowing, and hoeing, and constant tillage, do much to retain moisture in the soil, by forming a layer

¹ The leveller, or *maya*, is usually a heavy plank some 6 inches thick and a foot in width, drawn by oxen. But from Bageshwar upwards, in Danpur and Askot, a toothed leveller is used instead of the smooth plank. The soil side in these parts is a hard clay and difficult to break. The small pointed teeth of the leveller, which resembles the *danyala* or harrow of Almora, but is rather smaller, pierce the clods and break them easily.

of dust over the surface. The capillary action by which moisture is brought up to the surface and evaporated is also retarded by the practice, common hereabouts, of spreading manure and leaf-litter over the ploughed and sown surface. Early in March the fields are ploughed a second time and again dragged with the leveller. The leveller is used more frequently in these uplands than in the *talaon*. The roots of the previous *madua* crop are collected in a heap, the thorny bushes growing beside and on the terrace walls are cut and burnt with the roots in the midst of the fields. Then manure is spread over the fields and ploughed in.

About the end of March a third ploughing takes place, and *aya*, or deep furrows, are ploughed into the fields, so that the paddy seed may be evenly sown. The seeds are selected at harvest-time and carefully preserved. Usually those fields which yield exceptionally good paddy crops provide the seed which is threshed out immediately, without any loss of time. It is sown broadcast in the level spaces between the furrows. As compared with practice in the lowlands, the sowing is very thin, a precaution against overtaxing the moisture of the soil.

After the sowing is over drainage guls or channels are cut and drawn round the fields, more especially on the upper sides, to carry away the excess water of the rainy season. The fields are now left to themselves until the monsoon rains begin. The rains come down by the third week of June, and by the end of the month the fields are green. The rice grown in the upland is known as *chaitoi-dhan*, because it is sown in Chait (March–April).

Upraon lands occasionally necessitate another operation. Torrential rain, immediately following the germination of the seeds, and followed by very bright and sunny days, makes the ploughed and levelled surface very hard. This is true more especially of clay soil. The tender seedlings are unable to penetrate the hard surface, so the land is harrowed or levelled a fourth time to release the shoots. If the soil is comparatively soft, or if it has hardened very slightly, it will be enough to apply the *maya* or leveller a fourth time. But in cases where the soil consists of clay, or has become very hard, the *danyala* or harrow (*ghanumaya* or toothed leveller) is used. This process is known as *palgarno*, or scratching the surface.

In July the weeding begins. There are two weedings in all, and both are done exclusively by the women-folk. The whole of August is occupied in minor operations, the chief of which is the *nalai*, or the uprooting of the tall weeds and grasses which have escaped the hoes of the weeders. September sees the paddy crop of the dry lands ready for harvest. In Chaukots, Nayas, Kaklasaons, Talla Silor, the Doras, and particularly the Salts in the Pali subdivision, and in Palbilons, Talladesh, Regurban, and Gumdesh in Kali-Kumaon, chillies and turmeric are substituted in some fields for paddy and *madua*.

All these places, being very hot, are well suited for growing chillies and turmeric, which flourish best under great heat. The system of tith is similar to that practised in paddy cultivation, except that the number of weedings here is greater. Highly manured sections of fields that have grown wheat are selected and ploughed thrice. After every ploughing the soil is hoed by women. Manure is applied more lavishly than for paddy. Below Vykiasen the seed, which is prepared by hulling and husking the better type chillies, is then sown broadcast, like *madua*, but above that place it is moistened and sown in furrows. There are four weedings, one every month from April to July. In August the weeds are uprooted by hand, the picking and drying of the ripe chillies begins in September and ends in November, 240 square yards of land (1 *nali*) take nearly half a *seer* (1 lb.) of seed, but the return is nearly six maunds. In Salts and Chaukots the people take more pains over the upkeep of the terraces, with the result that the output of the fields is above the average.

Turmeric is grown side by side with chillies. It requires excessive heat, which is often artificially generated. Hence the very hot lands in the neighbourhood of the Bhabars, e.g. Salts, Talladesh, and Regurban, where *sal* (*Shorea robusta*) leaves are plentiful, are typically suited for its growth. Regular furrows 6 inches apart are cut by the plough. The ploughman is followed by three to five persons, who plant the tubers at a distance of 5 to 6 inches apart in the furrows. The tubers in one furrow are covered by the soil thrown out by the next. As soon as the tubers have been planted in all the furrows, the field is covered with a thick layer of *sal* leaves. This thick covering of *sal* leaves not only generates artificial heat and promotes germination, but it also serves as a valuable manure when the leaves rot in the rainy

season. In some places leaves of the oak and the *timul* (a kind of tree growing in the hot lands) serve the same purpose as the *sal* leaves. The turmeric crop, in addition to turmeric proper, also yields the auspicious red powder so commonly used in daily worship.

Chillies and turmeric are often raised for commercial purposes. The people depend upon these crops for their land taxes, clothing, salt, and other necessities. Even the poorest man in Salts is able to sell Rs 10 worth of chillies.

The corners and edges of the better-class fields, and the whole of the inferior terraces, are sometimes sown in the *kharif* with either *kauni* (*Panicum Italicum*), *jangora* (*Oplismenus frumentaceus*), or other inferior millets and oil seeds, instead of paddy or *madua*. They are all sown after the fashion of *madua*. In some places sugar-cane, amaranthus, and buckwheat (*ogal*) are also grown as a *kharif* crop.

The *rabi* here consists of wheat, barley, and mustard. Only those fields which were under paddy in the *kharif* are sown. Half the village lands that produced *madua* in the *kharif* lie fallow and deserted. The tillage for the *rabi* is not so thorough as for the *kharif*. There is only one ploughing, and the sowing and manuring are hurried through. This is done with a view to preserving as much moisture as possible. It is necessary also because wheat requires greater moisture at the sowing season and during the period of its most rapid growth. Places which have plentiful spring rains, or where the snow falls abundantly during the winter, are thus well suited for its cultivation. Wheat does not require a great amount of heat, and at the same time it can endure extreme dryness. As it can ripen very quickly, the extreme cold of the winter is no obstacle to its growth. This fact shortens the necessary period of heat for maturing it, and even a fortnight of bright, sunny days in March or April are enough to ripen it. The best crops are obtained if the winter snow falls during the months of November and December or January and February. A local proverb says that snow during these months means so good a crop of wheat that it becomes a problem to find space for its storage. The deep snow protects the crop and provides the necessary moisture. But between two heavy falls a fortnight or a month's dry weather is absolutely essential. "*Huwain Gwain*" is a common saying, i.e. if there is heavy falls of snow in December or February there will be a bumper

wheat crop. Temperate winters, with successive frosts and thaws, are less favourable than severe winters with occasional abundant falls of snow. There is a general geographical coincidence between regions of abundant snow and regions of wheat cultivation. A moist climate, such as that of the valleys, is unsuitable for the cultivation of wheat. It cannot endure excessive rainfall. The crop exhausts the soil, and the farmers never raise two crops of wheat in succession from the same land. Rich soils, such as clay and alluvial mud, are especially suited to it. All operations connected with this crop are completed by November, and the fields are left to themselves until the harvesting season, in April to May. Only in the *talaon* lands is special attention given to wheat, elsewhere the cultivators do not expect a large crop of wheat. After the sowing most of the villagers migrate to the Bhabars, returning only when the grain begins to ripen. Unlike paddy, wheat allows the cultivators long periods of leisure. From December to February they have practically no field work to do.

Barley is another main crop of the *rabi*. It is grown in the wheat zone, and even beyond it. It does quite well in the damp, hot river valleys, as well as in the dry, cold Himalayan altitudes. It is the hardiest and most adaptable of all the cereals. In the lower regions its use is confined to animals and the poor. It is not used for brewing, as in the Punjab. Its cultivation is precisely like that of wheat.

CHAPTER IX

WET-FARMING IN THE HIMALAYAN VALLEYS

(THE *TALAON* LANDS)

As a rule, the highland valleys of the Himalayan rivers are narrow, with steep slopes rising almost abruptly from the rivers' banks. This is because the rivers have been forced to cut a sheer passage for themselves in the hard, rocky mountains, the bases of which almost touch one another. But here and there, when the mountains no longer form barriers, some of these swiftly flowing rivers lose part of their velocity and widen out at the foot of the hills, where broad, long level spaces, like oases in the deserts, are formed.

These plains or oases are known in Kumaon as *talaon* lands, or lands irrigable and irrigated. All the *talaon* lands are situated near the rivers, or their tributaries, or other perennial streams. Sometimes also a few fields are found near springs and ponds. From the agricultural point of view, these broad river valleys, such as those of the Kosi, the Ramganga (western), the Gumti, the Garur, the Kothlar, the Gagas, and a few others, represent the best type of fertile country. They are all low-lying, and are enclosed and sheltered on all sides by forest-clad or terraced ridges, thus forming, as it were, "islands amidst the mountains." Their low level ensures a mild climate, suitable for growing many tropical products. The soil consists of fine alluvium deposited by the river, or washed down by the rains from the hill-tops, with the rocky detritus detached by the glaciers, and finely ground. The water supply, and the different levels of the fields, facilitate permanent irrigation. The fields can be terraced with less labour on account of their soft and level surface. The terraces are not very high, and often mud walls 1 or 2 feet in height are sufficient. The stones for building the walls of the terraces are found in the coarse gravel of the stream, so that the cost of carriage is minimized. All these factors have made these low riparian lands very fertile and densely populated. The best and most highly developed form of agriculture is found here.

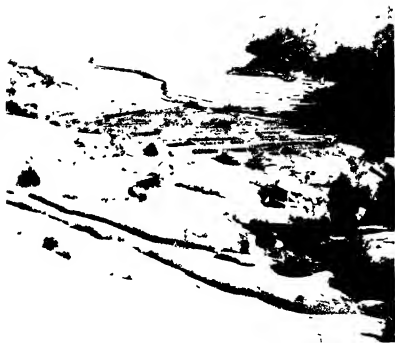
Like the *upraon* lands, the *talaon* lands are of two kinds. The first-class irrigated lands are known as *seras*. In these the water supply is perennial, and its flow very gentle. The fields are low-lying and hot, and as level as writing-tables, they can be flooded with water whenever required. Their alluvium consists of the finest clay. They are invariably double-cropped, and sown with the finest varieties of rice in April. They also produce all sorts of tropical and sub-tropical products.¹ Between the *seras* and the ordinary irrigated lands there is a wide difference. The best *seras* are those of Bansuli near Ranikhet, Mandal in Bageshwar, and the Khasparja basin of Pithoragarh. The first of these is situated on the Gagas, and consists of 5,000 *nalis* (1 *nali* = 240 square yards). There are four channels (*guls*), each 1 to 1½ miles in length. The water in these channels has sufficient power to turn twelve water-mills. Never within living memory has a famine visited the Bansuli sera. It pays an annual revenue of Rs. 600 to the Government. The *seras* that line the Ramganga from Chaukutiya to Masi, the Banau from its source to its junction with the Ramganga, the valleys of Kothlar and Khetsar in the Giwars, the Jaigania in Rithagar, and the Upper Gagas in Kairarau, and the Lodh, Mansari, and Kausani valleys which converge at Someshwar, all belong to the first category of *seras*, and are the most prosperous agricultural tracts in the whole district.

Mr. Batten has given a picturesque description of one of these *seras*. He writes: "Perhaps in no part of the hills can anything more beautiful be seen than the valley of Kosila (Kosi) in Borarau, especially near Someshwar. The mixture of the natural scenery of wood and water, the care-displaying fertility of innumerable fields, and the sprinkled human habitations remarkable for their pretty architecture, make up a picture which it would be difficult to equal in any part of Asia."²

¹ The remaining irrigated lands come under the ordinary hill-side *talaon*. They are irrigable, and are irrigated from intermittent streams, and the water in these is not available until the rains break. They are sown in June. What are known as *panchar* and *shimar* lands also come

¹ Their only defect is their liability to floods, when everything is swept away, as happened when the river Gagas rose in 1840 and 1880.

² J. H. Batten, *Final Settlement Report* (1851), p. 256.



IRRIGATED TERRACES

under this heading *Panchar* consists of imperfectly irrigated land. It is less fertile, because the detritus is of a coarse type, and it is not invariably irrigated. It lies at a higher level than the *seras*, the water for irrigation is scanty except during the rains, and the fields are not quite flat. Only an occasional sprinkling is possible, and this reduces the importance of the *panchar* lands. In wet years they are equal to the best *talaon* as regards production, but in years of drought they are hardly better than the *upraon* lands. In dry years, owing to the scarcity of water, they cannot get even an occasional sprinkling, for then the water available is not sufficient even to irrigate the *seras*. Sometimes, when seed nurseries have been sown, water for irrigation is brought by the women-folk in jars from the neighbouring springs and pools.

Shimar is waterlogged land, like the fens and marshes of the Terai. It produces only one crop a year, usually that of the best rice, e.g. *basmati*.

The district contains a total irrigated area of 24,592 *bissis* or acres (1 *bissi* = roughly 1 acre). In 1863-72 this area was only 23,604 acres.

The method of agriculture prevailing in the *talaon* lands resembles the method practised in the Indo-Gangetic plain. In one respect the *talaon* fields are even superior to those of the Gangetic plain, since, unlike the latter, they can be very easily drained at any time, on account of their different levels. As a rule, the *talaon* lands are always under cultivation, and never allowed to lie fallow. They are invariably double-cropped. The agricultural year begins in March to April, when the *rabi* (spring crop) is reaped and the fields ploughed in for the *kharif* (autumn crop). The *kharif* in these lands consists of paddy only. Paddy requires great heat, great humidity, and a dense population. All these are available in the *talaon* lands. We have seen that they are hot, owing to their low level, and that the streams and rivers provide them with sufficient moisture. The level surface of the fields allows the water to flow evenly over them. The alluvial soil is rich and easily worked. The great density of population in this region of family life insures not only a plentiful labour supply, but also minute care and continuous labour.

In addition to these permanent factors, there are certain other less

permanent features which often greatly assist the production of paddy. Such, for instance, is a heavy fall of snow during the winter on the surrounding mountains, which feed the streams of the valley, or again, a good rainfall in March or April, succeeded by bright and sunny days in May and June. Heavy and incessant rains from June to August are always welcome, and so is fine weather with occasional showers and cold dews during September. All these factors have made this region pre-eminently well suited for rice-growing, which is the most typical example of water-culture.

There are three methods of rice production in the Kumaon Himalayas, viz. *saya*, *khagi*, *ropa*, or *ropai*. The fields which produced barley during the preceding winter are prepared and sowed under the *saya* system immediately after the barley crop has been harvested, i.e. in April to May.

Under the *saya* system, the fields are ploughed only once. After ploughing, the carefully terraced fields are divided into a series of perfectly flat trays, which not only receive water, but retain it for eight or ten days. The water is retained by little dykes or embankments known as *minolas*, which surround each field and are carefully maintained. Water-channels are opened merely by kicking aside a clod of mud, when the field trays are filled with water up to the brim. It is replenished from time to time, and is not allowed to become foul owing to stagnation. Usually the channels are opened in the evening and are closed the next morning. This twelve hours' penning-in of the water in the trays completely saturates them and makes them more or less boggy. When the fields become boggy they are harrowed with a rake known as *sanidanyala*. This wooden harrow, with its seven or eight teeth, is drawn like a plough by bullocks, which wallow knee-deep in the mud of the inundated field. This reduces the soil to a semi-liquid mass. No clod-crushing with a *dalar*¹ is necessary, for the action of the water and the rake does all that is necessary. Harrowing done, the mud is thoroughly kneaded, like baker's dough, by the men and women with their hands and feet. The semi-liquid mud is then levelled. This operation is known as *topan*.

While the fields are being thus prepared, the seeds are simultaneously subjected to a peculiar operation. The seeds, which were

¹ The *dalar* is like a polo-stick, and is used as a clod-crusher.

carefully selected and stored in mud-plastered baskets after the harvest, are now examined and tested by winnowing. They are then thrown into a large cistern containing water, which should only just cover the seeds, or submerge them by no more than an inch. The seeds now remain under water for a full week, after which they are again transferred to large bamboo baskets, locally known as *dalas*, and carefully washed. They are then transferred again to similar but smaller bamboo baskets, lined inside with walnut leaves and sometimes with wild hemp, so as to increase the temperature and quicken the process of germination. When the seeds are covered in this fashion the baskets are often plastered completely with cow-dung and mud. These baskets are now exposed to the sun during the day, and are carried indoors and placed in some warm corner for the night. This continues for four or five days. After the lapse of this period, the cultivator peeps through a hole to see whether the seeds have germinated or not, and if no germination has occurred the time is extended by a day or two. But in case germination has started, the basket is opened, and the seeds are scattered over the prepared fields. The process of strewing must be carefully carried out, for the seeds should not be allowed to come into contact with one another. Sometimes the roots of the seedlings become intermixed, when they have to be combed and separated with the fingers.

Sometimes it happens that the seed has germinated before the fields are ready, since a cultivator's turn for watering his fields may not come round until some days after the seed has been treated as above. In such cases the germinated seed is carefully dried in the sun and kept in baskets. It may then be sown whenever convenient, even after a month has elapsed, but before sowing it must again be immersed in water for an hour or two. The seed retains its vitality in a wonderful manner. Having been sown, the fields are covered with animal manure, or with pine-needles and oak-leaves. The manure and the leaves are collected in advance, and are heaped at the corners of the wheat-fields during the winter by the women-folk, who at this season are comparatively free from field-work. In the midst of the green wheat-fields the greyish-black heaps of manure form a pleasing contrast. The covering of the trays with leaves is very completely and thoroughly effected. If any space is left bare or incompletely

covered the seed-sprouts are destroyed by shrinkage or bursting. But when carefully covered the paddy plants sprout within a week. The action of the moisture very rapidly decomposes the leaves, and they form an excellent top-dressing.

When the plants are out they are flooded again at fixed intervals. With the growth of the plants the weeds also appear, so the next operation is to remove the weeds before they injure the plants. The weeding begins immediately the plants are up, in the middle of July. Generally three weedings are practised. The first is known as *nalai*. For the *nalai* the fields are first flooded, and the weeds are then rooted out with the hands, and dug into the field again with their roots upwards. This serves to kill and rot the weeds, and helps to manure the fields. Throughout July and August the fields are flooded with just the right amount of water for a fixed period every day. This flooding itself helps to deter the growth of weeds. A scarcity of water leads to an excessive growth of weeds, and these reduce the strength of the rice-plants and ultimately diminish their yield.

But in places like Rithagar the fields are submerged continuously under the same water throughout the whole period of growth. The water is replenished whenever its level is seen to be falling. No weeding is undertaken, but the harrow is used thrice, as for the upland *madua* crop. The harrowing uproots many paddy plants and weeds, and heaps are formed at intervals. After the third harrowing these heaps are scattered and spread over the field with the hands. The water is drained off when the grain begins to ripen. After draining the fields look white, on account of the thick mossy layer left by the stagnant water.

Rice culture necessitates yet another tedious operation. There will be found growing in the fields, in addition to the rice plants proper, certain counterfeits and impostors, which it is very difficult to detect. The chief of these is *pahar*, or self-grown rice. Paddy-seeds left out in the fields at the time of the preceding harvest reproduce themselves in the succeeding *kharif*, when they obtain the necessary humidity. These self-grown plants are a great nuisance to the cultivator. They are almost exactly like uncultivated plants, and are very difficult to differentiate from them. If they escape the vigilance of the weeder, much of the nourishment of the soil is wasted, and the waste is even

greater the following year. Such plants are very destructive to the best and most delicate varieties of rice, e.g. *dalbadal* and *gajaya*. The seeds, after coming to maturity, fall out readily and reproduce themselves the following year, and again tax the detective powers of the weeder. To enable the cultivator to detect this inferior paddy, a sort of rotation of different varieties of rice is practised. If the field was sown with the white variety of rice last year, it is sown with the red variety this year. The nature and the colour of the stalks help to distinguish between the real rice and the *pahar*. The green stalks mean *pahar*, and these can easily be weeded out. If this rotation is omitted it is very difficult to differentiate between the two until the ears come out. The ears of *pahar* contain many beards, and the grain falls out easily. It is lighter in weight and darker in colour, and ripens earlier than paddy, hence at this stage it is easily detected. But to leave the detection to this late stage, when the energy of the soil has already been taxed, is not very economical.

Next in notoriety, but equally troublesome, is the weed known as *dhaun*. It can be recognized only at a late stage, when it has grown to some height. The infant plant resembles the paddy proper, but after a few days' growth it is easily distinguished by its leaves, which differ slightly from those of paddy, and its bush-like growth. When detected it is weeded out by the women-folk.

Early in September, when the crop has nearly matured, the water in the fields is drained off through small drains known as *hatol*. This conduces to quick ripening, and makes the fields hard and more suitable for harvesting. As the duration of sunlight here is short, the ripening occupies a longer time than in the uplands. The crop is ready for harvest by the end of September, and is reaped with the sickle.

The *khagi* is the second method of rice cultivation prevalent in the *talaon* lands. The paddy sown under this system is also known as *huni dhan*, or winter paddy, because it is sown immediately after the winter is over. The fields selected for this type of cultivation are usually those that were left fallow or produced barley during the winter, but sometimes wheat-fields are selected. The first ploughing is done in January or February. In February or March there is a second ploughing, when all the village and farmyard manure is ploughed

in If the rains do not fall after this ploughing, watering is necessary The fields are submerged under water for eight to ten days, after which the flow of the water is stopped and the fields are left to dry for a little while The surface of the soil is thus converted into very soft mud. When the ground has been thus softened, the seeds, which have already been moistened for three or four days, are scattered broadcast The fields are now ploughed a third time, and then the clods are broken and crumbled with the *dailar* and levelled with the hands The seeds are thus completely covered with the soil Sometimes manure is again scattered over the sown surface The plants come up in about a week The remaining operations—e g weeding and harvesting—are the same as under the *saya* system This system is also known as *kwara* in some parts of the district

The third system, known as *ropa* or *ropai*, is the most usual of all It is the plains system of rice cultivation by transplantation In May or June some of the field plots are selected and earmarked as seed-beds Usually the selection is made only from those fields which were sown with barley during the preceding *rabi*, since they are vacated earlier than the wheat-fields, and contain more moisture—barley being a less exhausting crop These plots are irrigated without any previous ploughing When irrigated, they are exposed to the sun for about a week The immediate result of this exposure is a surface of soft grey mud The barley roots are then lifted by hand and heaped at the corners of the field When this has been done the plots are ploughed and the clods crushed by means of a wooden plank (*maya*) which is drawn by oxen The manure is spread over the fields either before or immediately after the first ploughing It must be fully decomposed and should be very fine, as coarse fresh manure damages the seedlings Thus manured, the fields are ploughed and harrowed a second time The seeds are now sown

There are two systems of sowing these nurseries The first is known as *patti binor*, or sowing in one solid and compact block with absolutely no gaps between The beds are sown with wet paddy and the seed covered with mud by the help of the plough

The second system is called *alrwalo binor*, and under this system the seed is sown in a number of small beds marked off by drawing furrows with the plough Each bed is divided into many blocks After

the seed is sown it is covered with soil by means of a plough, and then furrows are driven at intervals of 2 feet. The mud thrown out by the ploughshare is spread over the surface, half on one side of the furrow and half on the other. This is done by women with the aid of a hoe. They also cover the seeds wherever they are left uncovered.

The quantity of seeds sown in these beds is double the amount which is ordinarily sown under the other systems. Thus, for instance, a field which is sown under the ordinary system with twenty *nalis* will require forty *nalis* under this system. This thick sowing is a precaution against the growth of defective seeds which produce defective plants or do not germinate at all. Each nursery usually requires ten seers of seed. The seed is moistened in water before it is sown, and the limited area of the plot necessarily renders the sowing very thick. The nurseries are now covered completely with mud, and then submerged under water for a period of twenty to thirty days. The flow of water during this period is interrupted only at intervals.

The plants come up after seven or eight days. Just at the beginning of the rains—i.e. by the second week of July—when they are about a foot or even 6 inches high, preparations for transplanting them are begun. All the fields which were under wheat during the preceding winter are very carefully ploughed, embanked, and then generously flooded. The ploughing usually begins in June, but the embanking and flooding are carried out in July. After flooding the soil is stirred, kneaded, and puddled. The embankments are now plastered for a second time, and the fields finally levelled and made ready for transplantation.

The preliminary arrangements for the actual transplantation must be made at least one day in advance. The nurseries must be flooded with water for twenty-four hours immediately before the plants are removed from them. The day previous to transplanting (fixed after consulting the astrologer), the women workers, accompanied by the proprietress or manageress of the field, assemble near the nursery for the purpose of lifting the seedlings. Each is offered a handful or two of rice, mixed with sesame and a red powder, by the proprietress. The sesame and rice they eat, and the red powder, after a little has been offered to heaven, is applied to the foreheads. The women, each with a red streak in the middle of her forehead, now

begin to uproot the seedlings in handfuls and wash off the mud adhering to the roots. The seedlings have to be carried to distant fields, and if they are washed their weight is considerably reduced, they are also more convenient to separate and transplant. A few plants are left out in the buds as an offering to the *manes*.

After washing, the seedlings are tied into bundles with grass. The diameter of each bundle is from 3 to 4 inches. Women alone participate in these two operations.

On the day of the *ropai* (transplanting) all the workers, both hired and exchanged (*palyars*), assemble in the fields where transplanting is to take place. The different tasks are divided amongst the various workers. One group looks after the regulation of the water, another begins ploughing the puddled soil, some are engaged in puddling and levelling, and some in supplying the fields in advance with the bundles of seedlings. In all these jobs the men play an active part.

When all these operations are completed the actual transplanting (*putisar*) is begun. This operation is carried out with as much ceremony as the laying of a foundation stone or the opening of a new building. But the man or woman selected for performing the transplanting ceremony must be physically very fit and active, no matter what his or her social status may be. He, or she, must be free from pain in the region of the waist, for otherwise, so superstition declares, all the transplanters will suffer pain and become lazy. The person selected is the first to receive the red powder, which is applied to one and all, including the oxen. The ploughman (*haliya*) and the drummer (*hurkiya*) are given some cash—usually a *pice*—in addition. After the first seedlings have been planted the women combine and form themselves into groups of ten, fifteen, or more, known as *palta* or exchange. They transplant the seedlings by turns in the fields of every family which has contributed to their formation. Taking two or three bundles of seedlings at a time, they begin to plant them. The fields have already been made soft and muddy, they are now completely submerged. Transplantation begins from one corner of the field, and the operators move backwards as the planting progresses. The plants are set at regular intervals of 3 or 4 inches, and from two to six seedlings are usually planted together. But in the case of exceptionally valuable rice, such as *kurmuli*, the plants are set singly.

Transplantation is a long, strenuous, unhealthy, and back-breaking task. Nearly all the work has to be done by women and children with their feet in the cold water and the burning sun on their heads—an arrangement which may be regarded as a conspicuous instance of the tyranny of the strong over the weak. After setting the rice-plant in its proper place, the worker gently presses the soft mud around its roots. No novice can do the work satisfactorily, but the women have become particularly apt at it.

As already observed, transplanting is a hard, exacting, and monotonous task, and highly injurious to the health of the workers. To relieve the fatigue and monotony, while assisting concentration and helping to speed up the workers, a sort of variety and singing entertainment is in progress during the work of transplantation. This entertainment is locally known as the *hurkiya bol*.

The *hurkiya bol* literally means the labour done by a *hurkiya*. *Hurkiya* is the sub-caste of the *doms* (depressed class), whose profession it is to play on a sort of drum (*hurka*), which resembles the *damaru* or drum of the God Mahadev. But in the case of the *hurkiya bol*, it is not necessary that the man playing on the *hurka* should always be a member of this sub-caste. Whosoever plays on the *hurka* while the transplanting is in progress is a *hurkiya*, no matter whether he is a *hurkiya* proper or not. A Brahman or a Rajput even may perform this task. The two essential conditions are, first that the *hurkiya* must be a man, women being debarred from the office, and second that he must be a good singer and must be able to remember a great many folk-songs.

Early in the morning, immediately after the work has begun, the *hurkiya* is seen playing on his *hurka* and singing the morning prayer. He faces the women-folk engaged in the work of transplanting, and moves gradually forward as the line of workers recedes, playing and singing continuously. When he has sung one line of the prayer it is repeated in a chorus by the women workers, and so on until the whole of the hymn has been recited. It is very pretty to hear the women singing as they dibble the seedlings into the mud. The most common form of hymn may be rendered into English as follows:

“O Gods, the pearl-like rice of these fields will be offered to you

as a cooked offering O harvest god of this village, be favourable throughout, and grant a shady day without rain for the setting of the plants Give the transplanter and the leveller this shade in equal measure Let the ploughman and the bullocks be endowed with equal speed Give quickness to the hands, and let the seedlings suffice for all the fields, O five-named god”¹

The morning prayer is followed by the invitation to the gods The invitation song describes the scene of the operation It relates how twenty-two pairs of bullocks are engaged in ploughing, six score of women in transplanting, and ten score of men in puddling, and prays the gods to ensure a magnificent crop by being present throughout the operations “May the stalks of the crop become costly as silver and the husked rice white as pearl and precious as gold” If such results are to be granted, the cultivator promises to bring an offering of the golden grains to the royal court of the great Mountain God Mahadev

But for the rest of the day the *hurkiya*’s time is given to singing such songs as have some historical bearing, or are of local interest, or relate an epic story from the Ramayana or the Mahabharata Certain love-songs are popularly known as *chakhuli* and *makhuli*, *baira* and *bhagnolas* These are species of popular folk-songs, full of similes which are drawn chiefly from the vegetable kingdom. The historical songs deal with local history. Some describe the unjust character and tyranny of the *Katyuri* kings, and some the valour of other princes, like Ratnichand and Bikramchand; and he is a poor *hurkiya* who cannot remember them all, though this means remembering hundreds of verses, word for word and line for line. Some of the songs are full of poetical ideas, and the airs are sweet and plaintive

The entertainment comes to a close in the evening with the recital of a benediction song This prays for a long life and a merry one, for all (including their descendants) who share in the work, from the

¹ Original —

Ye seri ka Motyun tum bhog lagla ho,
Sewa diya bid ho
Ye gonka Bhumya paro daan haya ho,
Roparo, Toparo barobari diya ho,
Haliya balda barobari diya ho,
Hato diya chao ho, Biyon diya faro ho,
Panchnama dev ho.

owner of the field down to the oxen. It certainly has a soothing effect on the hearer. *Hurkiya bol* accompanies the weeding rice and *madua* also. In weeding, however, the *hurkiya* walks backwards while the women move forwards.

The *hurkiya*, while he entertains the workers, acts also as a task-master and overseer. He admonishes in verse the slower hands, and holds them up to the ridicule of their fellow-workers.

Usually the *ropai* occupies only one day, excluding the time taken in uprooting the seedlings. Those having only a very small holding do not lift the seed-plants on the day before the actual setting, but on the morning of the *ropai*. The operations begin at 6 or 7 a.m. and last until sunset, with an interval from 12 noon to 2 p.m. for food and rest.

On the day of the *ropai* the owner of the fields or the head of the family observes a fast. After taking a bath in the evening, when the operations are over, he offers light and food to his gods. He does so because the seedlings which he once took so much pains to sow have been uprooted, and also because many insects have been destroyed in the course of the operations. After this he breaks his fast. This practice of fasting is now being abandoned.

The *ropai* entails much expense. In addition to the payment of wages, the payments in kind (in the shape of food) are also considerable. The total expenses, including cost of grain, amount roughly to Rs. 5 per *nali*. A more detailed estimate has been given in Appendix B, page 245.

One *ropai* at a time in one village is the established rule. The bigger *ropais* come first. This matter of precedence is mutually arranged, and goes far to compensate for the dearth of labour.

When the plants have thus been transplanted, they must be watered at regular intervals. The fields are under water for a month or more. While the watering is continued, the weeds appear. They have to be nipped in the bud, and therefore the weeding is performed simultaneously with the watering. The weeding is done as in the *saya* form of cultivation. But greater attention is given to the watering, which is carefully supervised and often repeated. There is a communal control over the channels, and every grower gets water in his turn. Sometimes disputes arise in respect of the supply of water. When the

rice has bloomed and the grain has begun to form the water is drained off the fields as under the *saya* system. But in some places a final watering is given a little while before harvest, in order to swell the ears. The rice is harvested in September or October, with the sickle. One *nal* or about two seers of seed produces some two maunds of paddy.

Rice is almost infinite in its variety. But, broadly speaking, the varieties can be divided into two groups—red and white. The white varieties are costlier and more esteemed as food, but they are very delicate and exhaust the soil rapidly. They germinate and ripen quickly, but cannot stand great variations of heat and cold. The best known of the white rices are *nandhani*, *kirmuli*, and *unta*. In some places *hansraj*, *basmati*, and *sal* are also successfully cultivated. Generally speaking, the finer kinds of rice are grown by the *saya* method.

The red varieties are less palatable and cheaper, but at the same time are easier to grow and less exhausting to the soil, and they yield a greater output. They are not seriously damaged by wild animals and extremes of climate. *Pargain*, *rasiya*, and *muth* are the best known, and are very widely grown.

A comparative estimate of the advantages and disadvantages of these systems of rice culture leads one to the conclusion that each system has its own peculiar advantages, closely adapted to the land on which it is practised. Under the *khagi* system irrigation and embanking require little attention, and there is no puddling. It yields a smaller return, but in the succeeding *rabi* crop wheat makes up for this loss, as it requires less moisture, and therefore grows well in the less copiously irrigated fields. On the other hand, the *saya* yields a larger crop, and is well suited to the superior varieties of rice. No red variety is grown under this system. But it necessitates a very large number of workers, and the labour entailed is far heavier than that required by other systems. A very plentiful water supply until ripening, and very careful weeding, are essential. The rice takes longer to ripen, as the growth is very thick and irregular. In *ropai* cultivation the yield is smaller than under the *saya* system, but equal to that obtained by the *khagi* method. It does not require such large quantities of water. If the rains fall late the rice plants can be kept alive in the nursery

plots Under this system the land for which no water is available during the hot months is as valuable as the perennially irrigated *seras* The method allows the labourer greater leisure, and is better suited to large areas Weeding and reaping take less time, but the search for "impostors" has to be very thorough. The rice is of a softer variety, and not so sweet and nourishing as that produced under the *saya* system or in the uplands The yield of the unirrigated *upraon* paddy is scanty and its cultivation laborious, but it is the most palatable variety On the whole, all these systems are variously adapted to soils of different composition and local supplies of water The *khagi* system answers best on clay soil and on sunny slopes e.g. in the upper Gagas valley Sandy and shady slopes are sown by the *saya* method, and in dry regions by the *ropa* Each system is complementary to the rest

The *rabi* crop in these valley bottoms consists of wheat, barley, lentils, mustard, and flax Wheat is sown in October and November in the fields where the *saya* rice was grown during the *khari* Soon after the paddy has been reaped the fields are ploughed and left exposed to the sun for ten to fifteen days to lessen their humidity When the soil assumes a greyish tinge the leveller is drawn across the fields to crush the clods thrown up by the plough Two or three days later a second ploughing is followed by a second crushing Manure is then applied and the seeds are sown broadcast The amount necessary to sow a *nali* (240 square yards) is about a seer. The fields when sown are ploughed finally for the third time This last ploughing completely covers the seeds with the soil But the finishing touch is given by the leveller, which is used this time with a view to compacting the surface, so that the moisture is retained by the soil When these six operations (three ploughings and three *mayas*) are over no weeding or other intermediate operation is necessary until the time of harvest, excepting an occasional irrigation if the snow and rain are not timely The crop is ready for harvest near the end of April, or in May, and yields from eight to ten times the seed sown The wheat sown, like the rice, is of two varieties: red and white In the *talaon* lands the red is generally grown, as it will stand even abundant moisture The white variety, though it is grown in the Kosi valley, is unable to endure an excess of rain if

this falls during January and February. The best wheat is grown in the first-class *upraon* lands.

Barley is sown in those fields which were cultivated under the *ropai* system during the preceding *kharif*. No pains are taken in its cultivation, and the produce is not of good quality. One ploughing is given before sowing and one afterwards. The fields are neither manured nor weeded. Sometimes the barley is reaped before the ears have appeared, and is given as green fodder to the cattle.

The transplanted paddy begins to ripen towards the middle of September. At this juncture lentil seeds are scattered over the ripening rice. When the paddy has been harvested the fields, instead of being ploughed, are spread over with coarse manure. After a while the little plants that have shot up begin to grow rapidly. The manure saves them from the dew and the frosts of winter. Lentils do not require any care during the period of growth. They are harvested by the end of April or May. Sometimes a stolen crop of flax is similarly obtained.

Before sowing mustard, the fields are prepared just as in the case of wheat. Three ploughings and three levelling operations are necessary. When sown the seed is not covered with a plough, but with a hoe. The manure applied is very fine. In December to January the plants are sorted by hand where there is an overgrowth. This is known as the *buna* or first sorting. The second sorting is effected in January to February, with a sickle-like hook instead of a hoe. The crop is reaped in March to April. Most of the seeds are pressed for oil by the village oil-presser. The oil is used for lighting as well as for cooking purposes. The green leaves are used as vegetables throughout the winter, and are sometimes dried and carefully preserved for the summer. The seeds of the variety known as *rai* (*Brassica juncea*) are generally consumed as a condiment.

But the entire *rabi* crop is not half so important as the rice culture of the *kharif*. Rice is in every way the most important staple in these lands, and the cultivator devotes all his energies to the production of this crop. In order to secure a good rice crop the valley peasant expends a tremendous amount of family labour in terracing, ploughing, embanking, harvesting, and threshing. Irrigation channels are dug at a great cost, and the soil is kneaded into a puddle with the hands.

and feet. He passes whole nights in the fields, watching the flow of water. Busy days and weeks are spent squatting in the wet, deep mud, like an amphibian, painfully transplanting the seedlings and anxiously weeding them when they have grown. The cultivated plants depend as much upon the fitness and strength of his muscles and those of his family as upon the climate and the soil. It would seem that in the art of producing this most delicate of food-crops he has very little to learn, having almost attained perfection.

CHAPTER X

COMMERCIAL CROPS

THE highland cultivator, in addition to the cultivation of the staple cereals for food, raises a few commercial crops as well. The proceeds of these crops pay his land revenue and leave him a surplus for his winter clothing, salt, and *gur* (molasses). Recently there has been a tendency to multiply the number of these crops, most of which are raised during the rainy months of summer.

The most important and popular of these crops is the potato. Potatoes were originally introduced in 1843. Since then their cultivation, and the trade in them, have developed enormously. Potatoes thrive in newly reclaimed lands, well-drained, and with friable and loamy soil. They are often most profitably cultivated on the slopes of the oak forests, where a thick layer of leaf-mould affords a very valuable manure. There are two crops, viz. the rainy season and the winter crop. The "rainy" or *kharif* crop grows without irrigation in high and cold altitudes locally known as *dhuras* or hill-tops. The most productive *dhuras* are those of Dhuraphat (Billekh), Seoni, Riuni, Shiahidevi, and Dunagiri. The potatoes in these places are sown either in March or April, and depend upon the rains for their growth. The March crop is harvested in July, when it is the first to reach the markets and fetches the best price. The whole crop is sold at a price which varies from Rs 3 to Rs 10 per maund. The April crop is harvested in August or September and yields better results on highly manured ridge-tops. Like the earlier crop, it is mostly exported, but some of it is preserved for seed.

The winter crop is grown with the *rabi* in places which are rather damp and warm, or which can be irrigated easily. Low-lying places which were quite unsuited to the *kharif* crop are quite suitable for the winter crop of potatoes. Hence it is sown chiefly in low-lying, hot, moist river valleys. The seed potatoes are first cut into several pieces, each containing an eye, and are then kept for four or five days in some warm place, often in the kitchen, in order to quicken their germination. The crop is lifted in June. The potatoes are white-

skinned, and are mostly consumed locally. No seed is kept out of this crop

The methods of cultivation vary in different soils. On the hill-tops where the slope is steep, no ploughing is done, only the hoe and the spade being used. The fields, having been thoroughly dug with the spade, are cleared of weeds and grasses. Parallel lines are then drawn at intervals of 2 to 2½ feet, and the seed thrown into place with the hand at intervals of 1 foot or 6 inches. They are afterwards covered with the hoe, and manure is spread over them.

In terraced fields, and the more level hill-tops—e.g. in Riuni—the plough is used thrice. In the first ploughing the manure is ploughed in and the roots of weeds and grasses removed by the women-folk with the help of the hoe. Then, after a second ploughing, the fields are dressed. Immediately after the dressing regular furrows are driven by the ploughshare at intervals of a foot. Every alternate furrow is then sown with the seed, and covered with the soil thrown out of the furrows that lie vacant. The seed potatoes are sown in the *ropai* fashion, and the *maya* or leveller is applied afterwards. The tops emerge in fifteen to twenty days if conditions are favourable. Rainfall after a fortnight's sunshine is ideal for proper growth.

With the emergence of the haulms weeds also appear. The first weeding takes place one month after sowing. If the rains fall at the right time the rows are banked for the first time a month after sprouting. A month later a second weeding and earthing become necessary, on account of the action of the rain, which washes down the previous bankings and levels the field.

Lifting is done with a hoe, and the crop is picked by hand. It is stored in bamboo baskets (*dalas*) or gunny bags. Sometimes pits are dug, and the potatoes are stored underground. At other times they are spread under the bed-cots inside the house.

The seed universally employed is "Carter's Longkeeper." It was introduced some twenty years ago by Mr. Norman Gill, the then Superintendent of the Government Orchard at Chaubattia. Mr. Gill was very successful in introducing some of the new varieties of potatoes in these hills. The cultivators are most enthusiastic over the profits made from the newly acclimatized seed, and invariably sow it. Recently some of the cultivators have introduced a second variety, viz. the

"Scottish Farmer." The results have yet to be seen, but from experiments made at Chaubattia it has been found to yield best in two-year old forest land without manure.

Both the export and the consumption of this crop are fast increasing. In the plains the *pahari* potatoes are considered the best, and supply the plainsmen with this vegetable at a time when their own crop has been entirely consumed. In the hills, too, during the summer and winter months, when other vegetables are scarce and dear, they are regarded as the best stand-by, and supply the needs of the poor and the rich alike. Their retail price varies from 1 to 3 annas per seer.

Ginger is grown chiefly in the hot, low-lying valleys. Before sowing, such pieces of land are selected as are not liable to the floods of the rainy season. Too much moisture spoils the crop, hence fields sloping are chosen, which are surrounded by deep drainage channels. They are deeply hoed and well manured. Ginger is said to flourish in plots manured with paddy husks. The tubers are buried in trenches, 6 inches deep, towards the end of March. After planting leaves are spread over the fields, as for turmeric. To prevent them from being blown away by the wind they are pressed down with bamboos or wooden poles. These poles are removed when the rains set in, but the leaves are not disturbed until the time of the harvest. The plants are weeded and earthed up. The crop, when ready, is lifted with the hoe. Ginger is grown mostly by the people of the valleys.

Hemp is grown on high slopes having a northern exposure. The ground must be cool and dry, with ample facilities for manuring. The fields near homesteads are abundantly manured, and so are those near cattle-sheds, it therefore flourishes best in such fields. The *pattis* of Gangoli, Chaugarkha, and Kali-Kumaon produce it in abundance. It requires no weeding and no irrigation. In newly prepared lands a crop or two can be raised without manuring. The plant does not flourish below 3,000 feet, as the heat of the valleys is prejudicial to its growth. The seed is sown in May and June, and in warmer places a little later, until the rains set in and lower the temperature. Hemp ripens in October, and almost exhausts the soil. Formerly there was an extreme prejudice against its cultivation, just as the high-class Brahmans of Almora are prejudiced now against

working of the plough with their own hands "May hemp grow in your house" was considered the worst form of abuse. This feeling has now completely disappeared

Hardly any part of the plant is wasted. But the chief products are the seeds and the fibres of the female plant. The male plant is useless except for its fibre. The seeds are considered to be a heating food, and are consumed as a condiment, being either milled or boiled together with vegetables. They also furnish oil. Large amounts of hemp seed are exported to the Government experimental farms in Gujerat, where it is used to improve the varieties of the plants used for medicinal purposes. In medicine the use of hemp is to serve as a substitute for belladonna.

The mature leaves, stems, flowers, and seeds yield *charas*, a black, resinous exudation which adheres to the palms when rubbed over them, and is scraped off with a knife or sickle. The manufacture of *charas*, though disallowed by the Excise Department, is still carried on secretly for domestic use. It is smoked by the villagers as a specific against the pains of colic, or to heat the body in extreme cold. A certain portion of the leaves is dried and smoked by mendicants.

The bark or rind of the plant furnishes the fibre, and the pith makes excellent torchwood. The male plants produce the best fibres. The stalks are cut when green and piled against the terrace walls to dry. After several days of exposure they become dry and brown, and are tied into bundles. These bundles are retted for ten to fifteen days in pools or running streams, being kept under water by stones laid over them. They are taken out when decomposed and saturated, beaten with wooden mallets and poles, and again dried in the sun. The fibres are then peeled off, working from the thick end of the stalk to the top, cleaned, and washed. When washed they are ready for spinning and weaving. The fibre is woven into a coarse canvas of great strength, known as *bhangela*, which is worn by the poorer people wherever hemp grows. Of this coarse hempen sackcloth very stout, durable bags known as *kuthalas* are made. *Kuthalas* are in great demand among people of the entire district, and are sold during the periodical fairs for a price varying from 4 annas to a rupee. Their capacity varies from twenty seers to a maund. Their length is 3 feet, and their breadth $1\frac{1}{2}$ to 2 feet. They serve the purpose of gunny-bags

The fibre is sometimes used for the manufacture of durable ropes for cattle

Spinning or weaving, outside Gangoli, is strictly confined to the Koli and the Agari, sub-castes of the *doms*. But in Gangoli, and especially in Athagaon, only the non-thread-wearing castes known as *Kuthaliya Boras* weave and spin. The Bora men usually spin and the women weave, on looms which resemble those of the Bhotiyas.

Tea was originally introduced in 1835. Although every encouragement was given to it, both by official and non-official agencies, it failed to achieve any marked progress, it could not compete with the Assam or the Ceylon teas, and has lost even the local markets. The passing away of the old generation of the English planters has obliterated the last traces of the efforts that were made to revive the industry. As matters stand, there are no prospects for this industry. Of the twenty estates, with a total area of 2,102 acres, which existed in 1911, only a few survive. The largest of them—i.e. Malla Katyur with 506 acres, and Kausani with 396 acres—were appropriated by the Government, and the land distributed amongst time-expired soldiers. They are now growing grain instead of tea.

Sugar-cane of two varieties is grown—the *ponda* or superior variety, and the *kanthu* or inferior cane. It is grown chiefly in the low-lying lands. The *ponda* cane is propagated by cuttings. It is a very tall variety, growing up to 12 feet in height, and 3 to 4 inches in diameter. It needs a generous rainfall and plentiful manuring. A cutting, once planted, will flourish until the fourth year, when replanting becomes necessary.

The *kanthu* cane is grown also in the *upraon* lands. Its cuttings are planted and replaced in the same manner as those of the *ponda*. Its juice is used for the manufacture of the inferior variety of *gur*. In places where communication is difficult, like Shor and Gangoli, every household has its own canes in order that it may be self-sufficing in this respect.

Rape is the chief oil seed. But in some localities sesame also is grown. It requires a rich soil and timely and gentle rains. The crop is weeded with a hoe, very carefully, as the plant is delicate. It ripens shortly after rice, and in order to catch the seeds which fall out of the pods at the slightest movement, blankets are spread under the plants.

The seeds are used for various feasts and fasts and other religious purposes, and the oil is highly valued

The two commercial crops of turmeric and chilli have already been described in the chapter on the upland cultivation Capsicum also is grown The larger and broader kind, which resembles small *brinjals*, is used as a vegetable, and is called *sagiya*, and the smaller and slenderer variety is consumed as a condiment

The *upraon* lands near the homesteads are heaped with dry cow-dung, which is burnt and the ashes strewn over the fields The fields are next dug with the spade, and small holes are drilled at regular intervals Immediately before the rains the small capsicum plants are transplanted into these holes The plants have been grown in highly manured nurseries, in which the seed is sown as early as March The nurseries are protected from the cold by a covering of dry grass held down with stones A more elaborate precaution is the erection of a thatch roof over the nurseries After the young plants have been transplanted, and until the rains set in, they are watered twice daily As the rains are almost due, the watering is seldom continued for more than a fortnight The plants need three weedings Large quantities of capsicum are consumed in the green state, and the rest, after ripening, is dried and consumed during the winter months The surplus, if any, is sold.

The same plants, if duly cared for and protected during the frosty winters, will yield an early crop the following summer In winter they have to be covered and tied up with dry grass and straw to protect them from the withering action of the frost and snow This method is practised near urban areas, where an early crop commands a high price

Similar methods of cultivation are practised in the production of certain other vegetables, such as tomatoes, egg-plants, and cabbages.

Vegetables are coming into more general use, and every villager has his small garden near his homestead, where the manure heaps are usually piled, and where they can be easily protected and watched During the rains such staple vegetables as pumpkins, cucumbers, marrows, and radishes are produced in these plots In the remote villages the vegetables are poor, small, and fibrous, and the hillman usually dries them for use in winter and summer.

But the villages near the urban areas—e.g. Khatyari near Almora and Badhan near Ramikhet—have specialized in the raising of good vegetables. Great care is taken in the selection of seed, which is usually imported from Poona, Calcutta, or Dehra Dun. It is the constant effort of every cultivator here to produce his vegetables as early as possible. The produce is carried daily in baskets to the markets and sold for cash to the retail vendors. During the summer months it fetches fancy prices, owing to the exodus from the plains and the scarcity of vegetables. Almost all the vegetables grown in Europe, as well as many other local kinds, are produced in large quantities. They are sold not only in the neighbouring towns, but are also exported to the plains in motor-buses during the hot weather. An enormous increase has taken place in the area devoted to the raising of vegetables. The technique of garden cultivation has also been considerably acquired.

In addition to garden produce, milk has also begun to command high prices in the towns. Hence milk-selling has become an important occupation in the suburban areas. On the other hand, poultry-farming is not so popular, because the population is pre-eminently Hindu, and abstains from eating eggs.¹

Together with vegetables, various kinds of fruits are produced. Many parts of the district are especially suited to fruit culture, as the indigenous apple, pear, walnut, and cherry trees and grape-vines are easily obtained. The wild stocks are grafted in the spring, and yield very fine trees. Like vegetables, fruit is of great assistance to the people. They are either sold for cash or consumed as they become available. In the Kosi and the Gagas valleys every villager has his own walnut and pomegranate tree. Plantains are quite common in Sira, Askot, Shor, and Gangoli, while oranges are produced in Gangoli, Bageshwar, Patgar, and Nail.

Fruit-growing has been very successfully practised near urban areas. The orchards have multiplied enormously during the last decade or two. The art of fruit culture has developed notably, and a flourishing fruit industry has been built up. The fruit-trees flourish

¹ Poultry-farming in Kumaon is confined to the depressed classes only. But in the neighbouring kingdom of Nepal conditions are quite different, and every household owns a few hens and ducks.

best in cleared deciduous forest lands, which are commonest near the urban centres

The Government Orchard at Chaubattia has rendered signal service by popularizing orchard fruits.¹ In the hot river valleys, such as Giwars, Talla Silor, and Bageshwar, mango cultivation was introduced by a few enterprising villagers some twenty years ago, with the result that mango planting has now enormously increased. New varieties and greater numbers of trees are planted every year. The mangoes, when ripe, are sold in the hill stations, and some are exported to the plains, as they ripen when the plains crop has been consumed.

But nowhere has the art of fruit preserving or the canning industry been developed to provide a winter supply of fruit. In years of heavy production the markets are glutted. The average annual output is usually much greater than the local demand, owing to extensive planting and over-production. The whole crop is brought to the market at the gathering season, with the result that very poor prices are realized. With scientific storage and canning, and the development of rapid, cheap, and reliable transport, the fruit industry should have a bright future before it. But the existing conditions are both inefficient and expensive. Any efforts towards their amelioration would greatly benefit the producers and lead to the prosperity of the region.

¹ In Nepal, while oranges are grown, apples and pears are very rare.

CHAPTER XI

MANURES AND MANURING

MANURE occupies the most important place in the agriculture of the hillman, since the soil is poor, shallow, and stony. The scouring action of the rains on the steep hill-sides is very pronounced, and it quickly impoverishes the soil. The paucity of cultivated land reduces the practice of fallowing to the minimum. These unfavourable factors have naturally compelled him thoroughly to appreciate the great importance of manure to his agriculture. In order to prevent the exhaustion of the soil, he must constantly and abundantly manure it, as manuring alone can compensate for its poverty. Manure is so important here that manure heaps are regarded as an index of the cultivator's wealth.

Soon after the crops have been reaped or lifted large numbers of women are seen carrying the manure in large baskets from the byres to the terraces. There it is stored in small heaps, at regular intervals all along the fields. Immediately before the seed is sown it is carefully spread over the whole surface, and then ploughed in. Most of it is applied to the richer crops, such as paddy, wheat, and chillies. The hardier crops, like *madua* and *jhangora*, are given small quantities of the coarser manure, but in this case the manure is scattered over the ground after the crop has germinated. In many cases it is used as a top-dressing only, it is not ploughed in, but is spread over the sown surface. It is generally applied in this manner in the *saya* form of rice cultivation, or in the fields where potatoes or yams are sown. Manuring is generally in full swing during November and December. At this time of the year the people are comparatively free, and large stocks of manure have accumulated. Hence a thorough manuring of every field is undertaken.

The most widely used varieties of manure consist of organic matter, cow and buffalo dung being the most usual. The cattle are kept in the lower part of the house, or in separate sheds. The floors of these sheds are thickly covered with dry pine-needles and oak-leaves, on which the cattle are bedded. Although the droppings are removed

daily, yet a considerable quantity of dung, together with urine, becomes mingled with the litter. Fresh dry pine-needles are spread daily over the wet litter of the previous night. The urine, when mixed with the litter and covered up, decomposes it and forms a solid mass. The piling-up of litter goes on for months during the winter, and very thick layers are formed.¹ The manure, whenever removed, is stored in the courtyard, or taken directly to the fields, being carried by the women in huge bamboo baskets. This system has the advantage of utilizing the urine, as much of it is soaked up by the dry litter.

Meanwhile, outside the sheds another heap is formed of the accumulation of daily droppings, which, as we said, are removed every day. In this case there is an enormous waste. The heaps are exposed to the action of the sun and rain, and a large amount of the organic matter is carried away by the heavy rains or evaporated by the heat of the sun.²

The wastage resulting from exposure is saved in the system of manuring locally known as *bhan*, in which the cattle are fed and penned in the fields. In Giwars, Kaklasaons, Salts, and Chaukots this is the chief method of manuring. Here, as in the Pyrenées, the cattle are forced to cover the fields systematically with their droppings. These tracts have no adjoining forests. There is a great dearth, not only of fodder, but also of litter. No pine-needles can be obtained for a daily change of litter, and the difficulties of transport are enormous. There are many parallel ridges, and each village, with its fields, is scattered over four or more rock-spurs. It takes a full day to cover all these ridges on foot. Hence, to eliminate the difficulties of distance, transport, and want of litter, the cattle are impounded in the distant fields from July–August to October–November.

As soon as the wheat crop is reaped, some of the fields are sown with *madua* and some with buckwheat. In these fields thatched hurdles or movable stockades (*pallas* or *pharkas*) are erected. The outer framework of these hurdles is of pine or bamboo, and the

¹ During the summer the sheds are cleaned once a week, but in the winter only one cleaning takes place.

² The district is singularly fortunate, inasmuch as the practice of utilizing cow dung as fuel is absolutely non-existent. An enormous wastage, which impoverishes the soil of the plains to the extent of some crores of rupees, is thus saved and utilized in enriching the soil.

thatch is secured by thin strips of bamboo tied with cords and fibres. In the southern and warmer parts, such as Talla Salt, where broad leaves like those of *sal* are easily procurable, a layer of such leaves is usually placed between the two thin layers of thatching-grass. A wooden handle is contrived in the middle of the hurdle, which can be lifted and carried. A shed is formed by placing a number of these hurdles side by side in a horizontal position, their upper edges resting on the terrace walls and their lower edges being supported by upright sticks. Their number is determined by the number of sheep and the goats to be impounded. Cattle are not provided with shelter, they are impounded in the open fields.

In addition to providing shelter for the goats, sheep, and calves, which are kept under cover at night, these hurdles are used as dwellings and kitchens by the men in charge of the cattle. The men sleep in the corners, and at each end of the improvised shed a fire is lit to keep off the leopards. Outside, in front of the hurdles, the adult cattle are tethered to their several pegs during the night, and also during the day when they are not grazing in the forest. As many animals as possible are collected—sheep, goats, cows, buffaloes, and bullocks—no matter whether they are milch or dry. During this period their number is increased by purchase, or by borrowing dry cattle from those who do not practise this system. Sometimes four or five families will combine and pen their cattle by turns in their respective fields.¹ The surplus stock of cattle is reduced by selling them in October and November, when the manuring is over. The animals are usually taken for grazing to the neighbouring forest during the daytime, but those in milk are kept on the tether and fed with the grass brought by the women twice daily from the jungle.

Early every morning the pegs are pulled out and driven in again in fresh places. The cattle are not allowed to stay in the same place for more than twenty-four hours. Thus every day the cattle are shifted to another field, and tethered there for a day and a night. The process of shifting the pegs is known as *kilsar*. The hurdles are shifted also, but not so regularly. The daily droppings are scattered in places where no urine has fallen. Thus by stages a new field is manured.

¹ In such cases the bulk of the cultivator's family migrates also, only one or two persons remaining at home.

every day, until all the fields have been enriched. But in some places, where the cultivator has only a few fields, or where a field is very poor, he allows the animals to remain in the same place for ten or fifteen days. The dung is first collected into two or three piles, and is then spread over the adjoining fields.

This system is very economical, inasmuch as it eliminates transport charges, and utilizes every drop of urine, also the fields are uniformly and evenly manured. Its defect lies in the fact that freshly deposited, undecomposed organic matter is often utilized, which proves harmful to the crops.

There is yet another system, in which the defect of utilizing fresh and undecayed manure is eliminated. This is known as *kharak badhan* (building sheds amidst the fields), and is practised in Athaguli and Doras. It differs slightly from the *bhon* system described above, and is employed in distant fields where there are ample facilities for litter. The animals are penned in one selected field, well away from the public highway and far removed from the village, and so situated that the cattle are not liable to damage the growing crops of the adjoining fields. Instead of remaining in the sheds, as is the case when they are kept in the village, they are tethered in the selected field, without covering, during the night. The young animals only are kept inside a temporary hut built in a corner of the field. No droppings are removed, and dry leaves are spread over them daily. The cattle are impounded in the field in July or August, and remain there until the end of the rainy season, that is, until September. The manure which has accumulated in the field since July is not disturbed until the beginning of the hot season (February to March), but is allowed to decompose for four or five months. In March it is dug out and spread over the neighbouring fields. Generally the fields which are to be sown with paddy or *jhangora* receive the lion's share.

The majority of the cattle are driven to the Bhabars from the western and southern parts of the district, the men take small plots of land on lease and erect their temporary sheds, and there they and their cattle live side by side. The manure is thrown on to the adjoining land, which is cultivated when the manure is fully decomposed.

During the winter months, when the itinerant flocks of the Bhotiyas are travelling throughout the district, the owners of the

wayside fields which are lying fallow heartily welcome them, and invite their owners to camp in their fields. Even a night's camping and folding of the flocks greatly enriches the soil. This practice is regarded as so beneficial that there is sometimes a regular scramble to secure the services of the shepherd's flocks, and the shepherd is given a small payment in kind of grain, vegetables, fuel, or fodder. The manure of these flocks is believed to be of very great value, and is said to be effective for at least three years. No other manure is applied to the fields during this period, once they have been well manured with sheep or goat dung. All the Bhotiya camping-places are carefully swept by the vigilant cultivators, and all the dung is carried away in baskets to the nearest fields, immediately after the flocks have moved off. Sometimes, as in Salts and Danpur, each family has its own goats, and their manure is carefully preserved for spreading over the rice nurseries or for other valuable crops.

Pony dung is supposed to be of very inferior quality. It is believed that it encourages various forms of agricultural pests. It takes a comparatively longer time to decompose, and does not mix well with litter. Often it is burnt when dry, and then the ashes only are used as manure.

No village has any proper sanitary arrangements for the disposal of the night-soil and rubbish. There are no privies attached to the houses, and hence no scavenging of privies. The result is that men and women soil the fields near their houses. Sometimes the streams and *gadheras* (glens) are used for the purpose. In the latter case there is no waste of manure, but in the former even this economy is absent. The night-soil in this case does not enrich the fields, but contaminates water which is often used for drinking purposes. The latter practice also is uneconomical, inasmuch as the night-soil and sullage water are allowed to soak into the ground immediately adjoining the inhabited houses. The pungent smell and the great number of disease-laden flies which it harbours sow the seeds of deadly diseases. The germs of such diseases as infantile paralysis and typhoid and other dangerous maladies are spread through these flies. The value of scientific scavenging is not realized. No dry manures are made of night-soil, and it is not used in market-gardening, even near the urban areas (as it is in Kashmir, especially in the neighbourhood of Srinagar).

Leaf-mould and dry leaves are also used largely as manure. During

the winter, when the leaves fall, pine-needles and oak-leaves are brought from the neighbouring forest by the women-folk, and stored in large heaps at the corners of the fields or near the cattle-sheds. They are used either as litter for spreading under the cattle, or are strewn over the fields. The action of moisture decomposes them during the rainy season. Leaf-mould is employed chiefly in the *saya* system of paddy culture, and in the cultivation of turmeric and yams. This system is very cheap and easy. Leaves and leaf-mould are abundant in the forests, and a very liberal use of them benefits the forests as well, inasmuch as the danger of fire is reduced. They cost little save the labour expended in gathering and stocking them.

In the unterraced *katil* cultivation trees, shrubs, leaves, and other rubbish are cut and burnt when sufficiently dry, and the ashes are ploughed into the soil.

A similar form of manuring is practised also in the regularly terraced lands. Just after harvesting the *kharif*, the terrace walls, which have become the homes of various thorny shrubs, bushes, and plants, are cleared, and the vegetation cut and left to dry in the sun. After a week or so they are heaped together in the midst of the fields and burnt. The ashes form the manure for the fields. This method is known as *kair* or *adya*. In some places—e.g. near Someshwar, where fodder is not scarce—the wheat straw, after the ears have been harvested, is not cut, but left to dry. When it is quite dry, pine-needles brought from the neighbouring jungle are mixed with it and then burnt. Later the ashes are ploughed into the soil, and no further manuring is done in these fields. Sometimes, instead of setting fire to the stalks, the cultivators turn the cattle into the fields, allowing them to graze on the straw. Their droppings are thought to compensate fully for the consumption of the straw.

Recently this practice has been modified and extended. The harvested fields are grazed by the cattle. When the straw has been eaten huge loads of dry leaves, especially pine-needles, are brought in from the forest, and a thick layer is spread over the fields. It is then burnt and ploughed in. The cultivators attribute the introduction of this practice to the progressive decrease of the yearly rainfall and to the early ripening of the wheat crop. They say that formerly the wheat crop used to ripen in June, but now it ripens early in May. There is

also a longer period of comparative unemployment, owing to the lesser amount of rainfall, the early sowing and harvesting of the *rabi*, and over-population. With a more abundant rainfall and a smaller population, the field-work occupied a longer period. In order to utilize this increased leisure, employment has been found in the practice described. *Madua* does extremely well in fields that have been treated in this way. Such treatment destroys the weeds and some of the agricultural pests.

Some crops, like ginger and turmeric, flourish if manured with paddy or *madua* husk (*kon*). Paddy husk is available for manuring purposes in the *talaon* lands, where paddy is chiefly grown. In *upraon* lands, and to a certain extent in the irrigated lands also, it is being largely used as a kind of fodder for the ponies. The itinerant *banyaras* (pony owners) have created a demand for it. Husk, when used as manure, is simply spread over the fields.

Green manuring is also practised by uprooting the weeds and allowing them to rot in the water. Sometimes, as for the spring crop, the weeds are ploughed in when the land is prepared for sowing. But the system is not systematically practised, and no regular crops are produced for this purpose. In the *saya* form of rice cultivation, however, the weeds are uprooted, and dug into the earth with the roots upwards. The excessive moisture makes them rot, and when decomposed they are easily mixed with the soil. In intermittent cultivation of the *katil* type the only dressing is of weeds, which are cut down, allowed to rot, and ploughed in.

Systematic and very successful experiments have recently been made in the Government Orchard, Chaubattia, with this kind of manuring. A variety of soy bean (*bhat*), which has been found most useful for green manuring, promises to prove a very important crop for this purpose, if the cultivators can only be induced to plough it in. This soy bean is small-seeded and poor in yield and oil content, but it produces the most luxuriant foliage of all the soys. It is trenched into the soil at its flowering period. It obviously improves the texture of the soil, and if regularly practised this manuring would greatly enrich the hillman's crops. Not only is there scarcity of manure in the hills, but the difficulties and cost of transport are enormous. Green manuring readily solves both these problems.

Charcoal manure is used unconsciously only in the lands adjoining the homesteads. All the rubbish of the kitchen, including the ashes and scraps of charred fuel, are swept and thrown on to an adjacent field, where it mixes with leaf-mould and cattle dung. In this form it surpasses every other kind of manure in enriching the soil, and is especially valuable for vegetable-gardening and fruit-growing. If consciously practised, it would be a great potential means of increasing the productive powers of the soil. It yields the most astonishing results in all forms of cultivation.

The irrigated lands known as *seras* are enriched by the periodic flooding of the rivers. The annual addition of silt brought down by the streams affords a very valuable and necessary top-dressing, and the same crops can be grown successfully on the same soil year after year.

These different forms of manuring, practised in the different parts of the district, are well adapted to the respective needs of the regions and reduce the cost of transport to a minimum. Owing to the plentiful supply of fuel and litter, the practice of utilizing cattle dung as fuel is entirely unknown, and the treatment of manure is far more advanced than elsewhere in India. With the help of ashes, cattle urine and dung mixed with litter, the comparatively poor terraces are forced to yield better crops, in order to make the Himalayan self-sufficing as regards his food supply.

CHAPTER XII

ROTATION OF CROPS

THE value of crop rotation in retarding the exhaustion of the soil is well known to the hillman, whose methods have evolved from the close adaptation of practice to environment and from countless generations of experience

We have already noted the crude rotation of the extreme north. But rotation is further developed and more systematic in the *upraon* and *talaon* lands. It is also more complicated here than in the plains. In the plains, the rule of rotation is that a field should bear a *kharif* crop one season and a *rabi* crop the next. Every year, during the *kharif* and the *rabi*, the same field produces two different crops, as the same crop cannot be gathered on both occasions. Thus every year a fresh rotation is possible. But this is not possible in the hills. Owing to the extreme cold, the early autumn crops are sown before the spring crops are ripe, e.g. the rice is sown before the wheat is harvested. Here one rotation is completed in two years, instead of in one, as in the plains, and the rotations are different in different localities.

In the unirrigated upland slopes there is a constant and uninterrupted rotation, which is completed in two years. The village lands are divided into two compact and continuous blocks called *sars*.

One of these is sown with rice and another with *madua* during the *kharif*. That which is under *madua* is known as the *madua sar* or the late *sar*, because *madua* is sown and harvested a month after rice. In addition to *madua*, a mixed crop of millets and pulses is raised. This mixed crop may sometimes consist of as many as six different millets and pulses, such as the radiatus variety (*mans* and *rans*), soy bean (*bhat*), horse gram (*gohat*), sorghum (*jwar*), and amaranthus (*chua*). The first four are legumes, and are grown as subsidiary to *madua* for preventing soil exhaustion. They are sown in May or June, and are harvested during October or November. After the harvest the land lies fallow until February. The fields during this

fallow period receive fresh supplies of mineral plant food and develop their bacteria. These processes are materially advanced if the fields are ploughed for the next *kharif* in January or February. The *madua sar*, during its fallow period, is known as *muk sar*. All the village cattle are now allowed to graze freely on the stubble and the remnants of straw lying in the fields. This practice of grazing by loose cattle, without damaging the adjoining *rabi* crop, is possible because one continuous block of land is left fallow, instead of scattered fields. Besides benefiting the cattle, the grazing adds to the manurial value of the fields. Every field receives some of the droppings of the cattle. The fallow is ploughed in February for upland rice. In the next *kharif* it becomes the *rice sar*. The general principle is that the *madua sar* is invariably followed by a fallow season of three to four months.

The *rice sar* is also known as the early *sar*, because rice ripens earlier than *madua*. Besides rice, it is sown also with *ghangora* and *kauni*. Both of these are sown in April and reaped in September. In lands which are too stony, or where the surface soil is too thin, *ghangora* is substituted for paddy during the *kharif* and wheat for barley during the *rabi*. This *rabi* ripens in April to May, when it is too late for the dry-land paddy to be sown in these fields. But there is still time for *madua* to grow, as it is sown in May to June. Hence during the following *kharif*, the *rice sar* is cultivated with *madua*, and once *madua* is sown the general principle that the field will lie fallow becomes operative and the *sar* changes its name.

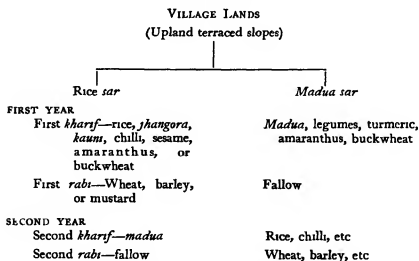
In the chilli-growing tracts, such as Salts, chilli is rotated with *madua* or turmeric. Similarly, in cold, stony, uneven soil amaranthus is substituted for rice, but wheat continues to be the *rabi* crop. Wheat can flourish under more disadvantageous conditions than barley, which requires level, stoneless, deep surface-soil. On the high hill-tops which are always covered with a thick mantle of mist during the rainy season, buckwheat is substituted for amaranthus, which is spoilt by the mist.

In the newly reclaimed untterraced land (*katil*), and in the outlying terraces, too remote to be easily manured, one full rotation occupies five years instead of the customary two years of the uplands. Here the division into *sars* is unknown. During the *rabi*, wheat or barley is sown, followed by *madua* and sesame during the *kharif*. After the

fallow season it is sown with *shangora*, and then left fallow for three years. This rotation is called the *tisala* or the triennial rotation, from the length of time the fields lie fallow. Before cultivating the land after the fallow season the vegetation is cut, burnt, and ploughed in.

Sometimes, if the land is too inferior, this quinquennial rotation is lengthened into one of six, nine, or twelve years. In the third year, instead of leaving the land fallow, horse gram or buckwheat is sown during the *kharif*, and then the land is allowed to lie fallow for six, nine, or twelve years. During this long fallow period the forest re-establishes itself, and provides a very valuable manure when it is cleared and burnt. The system becomes rarer every year as the population increases.

To sum up in the uplands rice, *shangora*, or chilli is sown in the first *kharif* of the series, followed immediately by wheat or barley for the *rabi* and *madua* for the second *kharif*. *Madua* is followed by a fallow period of three to four months. One *rabi* crop is thus omitted, and the series commences anew with rice. During the *kharif* both the *sars* are under cultivation, but during the *rabi* one *sar* lies fallow. The following diagram shows the rotation at a glance.



The irrigated lands have both a low level and a high temperature. They are highly manured by the annual deposit of silt, and their water supply is assured. These advantages enable them to produce one rice crop every year. *Madua* is too poor a crop for them to grow,

and therefore the division into *sars* is absent. The rotation becomes a simple one, like that prevailing in the plains. Rice is the standard *khari*f crop, and wheat and barley the winter crops. Two crops are grown regularly every year, and no land is left fallow for any part of the year. Occasionally every third or fourth year the wheat crop is omitted, because continuous wheat production during the *rabi* has a prejudicial effect on the quality and quantity of rice during the *khari*f.

In addition to this simple rotation, there is in the irrigated lands a second and more complex rotation, in which the crop for the *khari*f remains the same for years, but the mode of cultivation and sowing is changed every year. We have seen that there are three systems of rice culture, viz. the *saya*, *khagi*, and *ropa*. For the purposes of rotation, these systems are divided into two groups. The first, known as the *saya*, really consists of the *saya* and the *khagi*, and the second of the *ropa* and the *khagi*, the *khagi* being divided between the two groups.

The fields which are sown under the *saya* system in the *khari*f will be growing wheat in the coming *rabi*, whereas the fields under the *ropa* system will be sown with barley, lentils, or flax during the winter. But in the next *khari*f the fields growing wheat will be sown after the *ropa* system, because paddy transplantation is performed late in the season, immediately before the break-up of the rains. This allows the wheat crop sufficient time to ripen and be harvested. The fields growing barley are harvested earlier than the wheat-fields, and are hence well suited to the *saya* form of paddy, which is sown earliest of all.

In the second *rabi* the fields which produced wheat in the first *rabi* will grow barley and lentils, and vice versa. Thus we see that the fields continue to produce rice in the *khari*f, but under different systems, while in the *rabi* they grow wheat one year and barley the next. One full rotation is complete in two years. This becomes clearer from the following.

First year .	First <i>khari</i> f— <i>Saya</i> rice
	First <i>rabi</i> —Wheat
Second year	Second <i>khari</i> f— <i>Ropa</i> rice
	Second <i>rabi</i> —Barley and lentils
Third year	Same as first year

There is still another rotation which is practised in the irrigated lands. In order to eliminate and detect the counterfeit or self-grown rice plants in the paddy fields, different species of rice are rotated every year. Thus fields growing white rice this year will be sown with the red variety next year, and the cultivator will be able to distinguish between the rice proper and the self-grown rice.

It will be seen that these rotations of the *talaon*, besides utilizing all the land and economizing tillage and water, discourage certain agricultural pests and weeds.

The rotation practised in the Bhabars is very peculiar. Here the *rabi* is far more important than the *kharif*. Instead of the usual three crops in two years of the hills, five crops in two years is the general rule. In order to produce *rabi* crops of mustard, as well as of wheat, a very long rotation is practised. Rice and wheat are rotated as in the hills, but in the following year maize is substituted for rice. Maize is ready in about two months, when mustard is sown in the same fields. Mustard in its turn is reaped in December, and the fields are sown with *ganara* (*Panicum mutaceum*), which ripens in April. This close rotation usually impoverishes the soil, and all the crops of the series are not equally successful. In some places, as the villages in the eastern Bhabars, rice is entirely eliminated, and tobacco and cotton are substituted for it. These are both commercial crops and yield a better profit than rice. Fields adjoining cattle-sheds are often heavily manured. Tobacco, in such fields, yields a heavy crop, and is hence rotated with maize until the soil is exhausted. When this occurs (in three years or so) wheat and cotton are raised. Wheat is sown either immediately after the cotton crop is reaped, or after allowing a fallow season of ten months, i.e. in the next *rabi*.

It will be thus seen that different types of lands have different systems of rotations which are closely adapted to them. As a rule, the system of cultivation and the method of carrying out the rotation are determined by the nature of the soil, the physical features of the locality, or the special needs of the cultivator. The treatment of the land, on the whole, is as good as is possible under the difficult physical conditions.

CHAPTER XIII

IRRIGATION AND EMBANKING

IRRIGATION, like terracing, is a very difficult task. It requires not only capital, labour, and patience, but also primitive engineering skill suited to local needs and conditions. The amount of land to be irrigated is dependent upon the quantity of water available. The problem is not, as in the plains, to lift water from a low level to that of the fields above. Irrigation by lift is not only absent, it is also unknown. The land is irrigated invariably by flow.

Generally irrigation mainly determines the value of the land. Of all the cultivated lands, the irrigated plots are the most costly and the most fertile. Of a total measured area of 301,621 acres (*bisui*) in the district, 24,592 or 8·15 per cent are irrigated.

Water is brought to the fields by means of leats or diversion channels (*guls*), which are taken from the numerous streams that feed the larger rivers and are available at the foot of almost every ridge. As a rule, the main streams and the larger rivers, e.g. the Kali and the Gori, are useless for irrigation, owing to the depth of their channels and their furious impetuosity. They are difficult to harness, and the length of the leats becomes longer, as the rapidity of the fall which determines the length varies inversely with the quantity of the water flowing in the stream.

Again, the difference between the flood level and the low-water level of a large stream is enormous. This invariably means that a channel must, for a long distance in the earlier part of its course, be taken below the flood level. But during the rains this portion is often entirely destroyed, even if cut out of the solid rock. Moreover, the beds of the larger rivers here are full of narrow gorges and deep canyons, so that there is very little level country on their banks which can be profitably irrigated, since it is quite uneconomical to incur the heavy expense of running a channel from them.

Smaller tributaries, and other perennial streams and rivulets, issuing from the forests and not from the glaciers, are most commonly utilized, e.g. the Kosi and the Western Ramganga. The former is

utilized for irrigation for the 20 miles from Lodh to Hawalbagh, and the latter for a nearly similar distance, from Chaukhutiya to Masi. Their supply of water and their fall are peculiarly well adapted for the construction of small channels. The water in both is always controllable, dams can be easily and cheaply thrown across them and do not need constant repair.

Besides these streams, the numerous permanent springs are utilized for irrigation. Some of these supply considerable quantities of water and are very easily harnessed. But the water in them is cold, and does not carry the fertile silt with it.

Before a channel is constructed, a convenient point in the stream is selected at which a crude weir or dam is built. The task of selecting this site is not very easy, and requires a good deal of ingenuity and shrewd observation. The various levels and gradients have to be judged without the use of any instruments. This involves an intimate knowledge of local conditions. The site should be so situated that a channel taken from it could not only irrigate the largest amount of land, but also harness the greatest quantity of water. The water supply should not deteriorate materially during the summer months. The general fall of the channels must be such that the water may flow easily and without soakage. All this is possible if the headwork is situated at the proper height above the plots to be irrigated.

After the selection of the site the construction of the actual headwork begins. It consists of a dam, or a stone wall from 3 to 6 feet in height, equal in length to the breadth of the stream. It is built of the huge boulders which the rivers bring down during the rainy season. All the villages which depend on it for their irrigation must help in its construction and repair.

Most of the dams are destroyed by the heavy monsoon rains and have to be rebuilt every year. Even those that escape this destruction have to be built up and repaired. Every year the rains scour the stream deeper and deeper, and it becomes necessary to make the dam higher and higher, so that water may be raised to the level of the canal.¹ Sometimes an entirely new dam has to be constructed, at a site higher up than that of the old one, while the latter is abandoned.

¹ Where the headworks are situated on level lands a good deal of surface soil is washed away, and the fields are badly flooded in the beginning of the rains.

for good. The annual repairs and reconstruction entail a heavy recurring expenditure. A dam 6 yards in length will cost roughly Rs. 20.

The dams divert the water of the stream by raising its level into small diversion channels or *guls*. Through these small channels the water is led along the hill-side to the fields. The formation of the country and the regular gradients of the soil often facilitate their construction. The country on either banks of the stream rises in a stair-like succession of levels, terrace upon terrace, and water is easily diverted from the higher terraces to the lower by simply digging the necessary channels. In low-lying level lands the ditches are made to run along the outer edge of the level tract, so that all the fields may be irrigated.¹

The *guls* or diversion channels and ditches are muddy earthen drains dug in the surface-soil. They are often more than a mile in length,² and the cost of construction varies according to their length and the nature of the land they traverse. The length is usually determined by the volume of water they can transmit, or by the height of the land to be irrigated above the bottom of the valley, or by the rapidity of flow of the stream. If the rock and soil through which the channels pass can be easily excavated the cost is very trifling, but it is multiplied greatly if they have to pass through hard rocks or porous soil. Hard rock, though costly and difficult to excavate in the beginning, proves very economical in the long run, because there is no danger of breakages and loss by soakage. In the case of very porous sandy soil the whole channel has to be paved with stone slabs, or walls are built and made watertight by cementing them with impervious clay.

Here and there, along the route of the channel, especially if it is a long one, precipitous rocks and ravines may intervene. Often, in such cases, it is impossible to carve out a channel in the rock, or to lead it across the bed of the torrent. Hence simple but skilfully constructed wooden flumes and aqueducts are employed. Huge trunks of deodars³ and pines are cut, and channels are carved lengthwise through their hearts. The two ends of the wooden trough rest

¹ Irrigation is sometimes effected near the banks of the streams without cutting these channels. A stream traverses several villages on its way down, and the water can be diverted into the fields by temporary mud embankments.

² In places like Dwaba, near Bageshwar, or Nailgarh, near Gangolihat, the length of the channels is more than two miles.

³ Deodar wood is usually preferred, because it is not easily affected by the action of water, whereas pinewood necessitates constant renewal.

on the banks of the ravine. But where the width of the ravine is great more than one trough becomes necessary. Rustic masonry pillars, often more than 40 feet in height, or tall wooden stakes resting on masonry bases, are erected in the middle of the ravine, supporting the junction of the troughs. Sometimes a wooden stake is erected in the middle of the ravine in order to support a single trough. The quantity of water transmitted by these wooden troughs is not considerable, but there is no leakage. A few noteworthy examples of such long channels with wooden flumes and masonry pillars are to be found in Danpur. The *gul* of Kapkot is more than a mile in length, and has masonry pillars 40 feet high. Similarly, wooden troughs nearly 20 feet long, crossing the ravines, are found between Girachina and Bageshwar. A single wooden trough, supported by a single stake, may be seen in the village of Pipali near Ranikhet.

These troughs are also used to line the diversion channel in some places, if the supply of water is small and the distance it has to be carried very great. The cost in these cases is enormous. One trough about 12 feet long would require the labour of two men for two days. Excellent examples of such long lines of wooden troughs are to be found running from Gananath to Vinayakthal and from Faipani to Kankot near Manilla. The latter is lined for about two miles with both wood and stone troughs.

Occasionally, and more especially during the latter half of the winter, and in the summer when the amount of water is considerably reduced, and where the distance it has to be conveyed is very great, a storage device is utilized. Huge *khals* or earthen storage tanks are constructed at convenient points along the stream, and the water is allowed to accumulate in them. When they are full to the brim the water is released. It flows with considerable force, and reaches its destination without any great loss by soakage from the earthen channels. If the water is not thus stored, most of it soaks through the walls of the muddy ditches, and very little is left for irrigation. In order fully to utilize the water supply either steel or wooden pipes should be used, or storage tanks constructed. Pipes are costly, hence the latter expedient is usually employed. Examples of such storage tanks are to be found near Naini, some 24 miles from Almora, and at Chowkuni near Ranikhet.



DAM AND IRRIGATION CHANNEL

The dam is constructed at an angle of approximately 45°



WINNOWING SCOOPS



SETTING OUT RICE PLANTS IN THE FIFID IRAYS

To the accompaniment of music as the work is unwholesome and monotonous. The drummer is seen playing on his drum

Usually it pays to construct these channels with a view to their serving a double purpose. They not only irrigate the land, but supply water to drive the water-mills. Hence it is a common sight to see one or more water-mills along their course. Their association with these mills has become so intimate that their water capacity is measured in terms of the water-mills they turn in their course. A *gul* turning two water-mills is described as a channel of two mill-power.

The capacity of the channels is regulated according to the water required by the different crops. For rice as much water as possible will be diverted to the fields, but in case of wheat, etc., a comparatively small amount will suffice. Often there is a dearth of water in the canals. The quantity of water depends in the main on the porosity of the soil, the gradient of the land, the level of the soil water, and the amount of the local rainfall. Generally the earthen channels are leaky and clumsy, and a great amount of water is lost by evaporation. Waterlogging occurs in clay soils.

From the main irrigation channels (*guls*) small distributing ditches (*kuls*) are taken, through which the water is gently conveyed to the terraces. There is a network of these ditches, a small channel passing through every terrace, while every irrigated terrace has a ditch along one of its sides. The water of the main channel, after passing through these ditches, eventually empties itself into the main stream. The ditches are destroyed every year and are dug again at the time of *kharif* sowing. The permanent channels are left intact.

The area under irrigation varies according to the locality. The terraces to be irrigated are made as level as writing-tables. They are divided into a set of compartments or *kharis*, which vary in length according to their situation and level, and which are generally bordered by distribution channels (*kuls*). Where the original surface is uneven the *kharis* or trays are necessarily more irregular in shape than in the more open and level tracts. The water from the smaller channels is so distributed that it irrigates, in turns, all the numerous trays, from the higher to the lower levels.

Each field tray, or each part of it, and especially the lower edge, is surrounded by tiny earthen dykes or embankments 6 to 9 inches in height. These are constructed when the land is ploughed after the *rabi* harvest. The mud at this time is drier, and with some of it the

edges of the fields are raised. These dry mud-raised edges are known as *atmeen*. They block every outlet and help to keep the field flooded with water.

The watering of the tray is effected by kicking aside a lump of mud from the wall of the distributing channel. It is admitted so gently that it does not widen the breach or carry detritus into the tray. After releasing the water, all the leaks are carefully noted and plastered. If the water has softened the mud and is sloughing it off the embankments, additional earth is applied until the leakage is entirely stopped. When flooded, the fields are turned into shallow ponds, and the soil is puddled and kneaded by bullocks and human feet. After the mud has been reduced to mire the fields are levelled, and the embankments, wherever disturbed, very carefully plastered. These plastered embankments are known as *meen*. The field now looks like a plate with a raised rim.

When the crop is about to ripen, supply channels are blocked and the water is drained off into the stream. Every small ditch is now dry, and is known not as *kul* but as *hatol* (waterless canal).

The chief characteristic of the Bhabars is that all the streams are absorbed into the sand and boulders. In order, therefore, to practise irrigation the channels are taken off at the points where the streams leave the hills. From such points impervious channels have been built, lined with masonry, which distribute the water to the fields.

It will thus be seen that hill irrigation is a most difficult, laborious, and expensive affair, and requires a good deal of local knowledge, keen observation, and large investments of capital and labour. This great expenditure of labour and capital in the building and maintenance of the irrigation systems is, however, exceedingly necessary, because on these irrigation facilities depend the productivity of agriculture and the prosperity of the hillman.

CHAPTER XIV

HARVESTING, THRESHING, WINNOWING, AND HUSKING

THE method of harvesting is almost the same with every kind of crop. Only the hilly nature of the country makes it here more clumsy and laborious. Once the harvesting has commenced, the hillman has little time for anything but cutting and carrying, as he is anxious lest the rain should fall and spoil his crop. Transport is difficult because there are no carts, and the plough-oxen cannot be used as they are already overworked. The sheaves have to be slowly and laboriously carried by men on their backs or heads from the fields to the threshing-floors or homesteads. This is the most critical period in the hillman's agricultural calendar, because he must complete all these labours within a very short space of time. If they are delayed the rain may come and waste the patient labour of so many months. Moreover, a ripe crop standing long in the field without being reaped means a deterioration of the food-product. Sometimes it is stolen, or destroyed, or eaten by birds and wild animals. A delay in reaping means also a delay in sowing, and this fact counts for a good deal in the hills. The seeds will germinate if sown in good time, but if sowing is delayed even by a week the sudden cold and the frosts will prevent germination until more favourable conditions prevail. Thus wheat sown at the end of October gives a far better yield than if sown in the first week of November. The difference between the last week of November and the beginning of December is still more surprising. A crop sown in November may germinate, as there are no heavy frosts then, but it will not germinate until February if sown in December.

Harvesting is exclusively the women's work. Women in teams of two to five, with their sharp sickles or *datulas*, begin to reap the paddy fields at the end of September. They hold the sickle in the right hand, take as many plants as they can hold in the left, and cut them close to the ground. If the field is still wet they stand, and stoop sufficiently to enable them to grasp the ripe plants. The whole operation is effected

without sitting. But if the field is dry, or sufficiently drained, they sit on their heels, and shift themselves by inches, in a squatting position, as the reaping proceeds. As the women reap and move forwards they gently spread the harvested rice over the reaped portion of the field. The plants are then left to dry for two or three days. After drying, they are heaped on the reaped fields in stacks called *kanyuras*, with the ears inwards. But when rain threatens, this drying process is omitted. Rice plants, as a rule, are not taken to the threshing-floor.

The first to be harvested is the upland paddy, as it ripens earliest owing to its earlier sowing, and the lesser humidity of the *upraon* lands. The next in order to fall to the reaper's sickle is the transplanted rice, the *khagi* and *saya*. The *saya* rice ripens last of all, because the fields under this crop are very wet. It also takes a longer time to reap, as the fields are difficult to drain.

In case of *madua*, *kauni*, and *jhangora*, the reaping is known as *tipan*, i.e. picking. The ears are comparatively few and very conspicuous. Hence all the ears are cut and collected, and the stalks are left standing in the fields. The women have specialized in this work also. The ears are stacked in the courtyards or threshing-floors for twenty to twenty-five days. When thus stored they begin to ferment. After fermentation has occurred they are threshed.¹

Wheat and barley are cut at the middle of the stalk, tied in sheaves, and stacked near the homesteads. During the daytime the sheaves are set to dry, either by spreading them out in the yard or by stacking them on end in twos or threes. As for other crops, such as millets and pulses, these are uprooted and stored in the yard to dry and then threshed.

Every hill cultivator has his own threshing-floor, which is usually constructed on a ridge where a current of air may be anticipated. Such a floor is commonly paved with smooth stone flags, the joints being carefully filled with mud and cow dung, in order that no grain may be lost. During the harvest season all these floors are full of field produce.

The technique of threshing varies in the different valleys. Sometimes the threshing of rice alone calls for the most laborious and

¹ Sometimes the ears are spread on the roof of the house to dry and threshed without fermenting.

elaborate methods. There are three methods of threshing paddy in common use

The first and most elaborate method is found in the valley of the Gagas. The ears of paddy on the stalk are spread out thickly on the threshing-floors, and yokes of oxen are kept circling over the grain and the straw. The grains fall out as the treading proceeds. As many pairs of oxen as possible are engaged by the mutual co-operation which is the most prominent feature of the rice-growing communities. When the ears and the straw have been sufficiently trodden, as much of the straw as possible is raked away with sticks. After this the grain is winnowed, and the rice is put into bags and sent to the storehouse. Two or three men are often employed, but one man alone can do the work. This system is called *paira*. There is a tendency in some places to abandon it, owing to the increasing subdivision of the holdings.

The system prevalent in the Kosi valley is not so elaborate, but is the most widely practised. It is known as *charan*, and no oxen are used to tread the corn. It is generally carried out by mixed family labour, men, women, and children working together, as a single person cannot thresh by this system. Two men at least, but actually as many as possible, are employed. The paddy, as a rule, is not taken to the threshing-floor for this sort of threshing. Light portable bamboo mats known as *mota* or *mohat*, manufactured in Danpur and 5 feet by 7 feet in area, are usually spread near the stacks piled up in the reaped fields. As many handfuls of grain stalks as there are men are drawn from the heap and held over the mat and trodden and crushed with the feet until all the grains fall out. The treading is usually done by the men. Beside the man treading the ears sits a woman with a small V-shaped stick (*parai*) in her hands. The trodden stalks and ears are thrown towards her by the man, to be further beaten with the stick. When the beating is finished she examines the ears one by one to see whether they still contain any grain. If there is no grain left in them she throws them away from the mat, when the straw is bound into bundles by a boy or girl. The whole stack is threshed in this way.

The third system is known as *tar*. It requires three or more men. After the mats have been spread near the paddy heap, a handful of rice plants is drawn from the heap and crushed by the men as in the

second system The men support themselves with sticks and steady themselves by putting their hands behind their waists As the crushing goes on one or two women draw the crushed plants from beneath the heels of the men and tie them into bundles These bundles are then thrown to another woman, who strikes them sharply, one by one, against a wooden plank or log or a stone lying upon the mat When the grain has fallen out or the ears have been detached from the stalks, the straw is tossed aside and heaped into stacks This system is more economical, but it requires an extensive floor of mats, and more men are engaged in crushing the ears The bundles have to be tightly and securely bound The division of labour is more thorough, and every member of the party can assist in it Its only serious drawback is that a considerable quantity of the grain is scattered beyond the mats while the bundles are being beaten against the plank or stone

Wheat is threshed out in the same way as paddy, by yokes of oxen circling round the threshing-floor But when the quantity is not very large a flat wooden mallet with a short handle is used

In the case of *madua* and *jhangora*, threshing is done with huge wooden clubs Two or three men beat the fermented ears recklessly, and with as much force as possible, since there is little danger of the grain being crushed This process is more primitive, there being no division of labour

Winnowing is done on the threshing-floors, with the help of baskets or winnowing scoops, known locally as *supas* These scoops are made of bamboo and are shovel-shaped, differing radically from those seen in the Indian plains Unlike the latter, they are plastered with mud and cow dung, and their breadth is half their length Grain mixed with chaff is lifted over the head in these shovel-shaped baskets and slowly allowed to fall to the ground during such hours of the day as are favoured by a suitable breeze The heavy grain falls straight to the ground, while the chaff is blown to a little distance, so that two distinct heaps are formed

The winnower needs a good deal of judgment in determining the height from which the grain should be dropped and the rate of dropping it The only drawback of the method is that it is dependent upon the wind, which occasionally fails In such cases the grain is either

winnowed by tossing it in the scoop, or a blanket is waved to create a current of air. Two men stand near the crushed heap and holding both the ends of the blanket wave it by moving the hands to and fro.

In the case of small seeds, such as *madua* and mustard, the seed after being separated from the husk is passed through a sieve, and then stored in large bamboo baskets.

Hulling, like reaping, is a woman's job. It is done in mortars (*ukhal*), which are quite different from those employed in the plains. Stone in the hills is easily available, and a cubical block a foot in diameter is selected, and a hole some 5 or 6 inches in diameter is cut in the centre by the stonemason. The stone, when thus hollowed, is sunk in a corner of the courtyard, or in the middle of a specially prepared floor, paved with stone flags, the joints being filled with mud and cow dung. The whole is now not unlike a putting-green, the hole of the mortar representing the hole on the green, and the green itself being represented by the paved floor. Hulling is effected by pestles, which are heavy clubs, some 5 to 7 feet in length and about 3 inches in diameter. They are usually made of *sal* wood imported from the Bhabars. Their middle portion, where they are grasped, is a little narrower and the lower end is always bound with an iron ring.

In the cavity of the mortar, and round about it, paddy grains are heaped, the amount of grain outside being some twenty to thirty times greater than that inside. The heap of grain is then pounded with the pestle. The women lift their respective pestles by grasping them in the middle and bringing them (by turns) down upon the grain. The cavity of the mortar serves as a target, as all the strokes are aimed at it. Usually two, and at the most four, women take part in the work. As they pound the grain they move round the mortar and try to push the grain scattered by their strokes towards the mortar with their feet. Sometimes another woman with a broom is engaged in this work of collecting the scattered grain. Occasionally, as in Salts, where many hands are not available, a bottomless basket is placed over the mortar, when the sides of the basket help to keep the grains together, and thus the collector's job is done away with. This process yields a clean, polished rice, but most of it is broken and crushed.

Hulling, like transplanting, is hard work for delicate hands, but

it is made easier by vocal accompaniments. It is usually done after sunset or during the night. Generally as much rice as is necessary for the daily use of the family is hulled at one time.

Paddy when pounded is husked thrice by means of a winnowing scoop, which is held at such an angle to the wind as allows the chaff to fly off. The first husking is done when the grain is partially hulled. The hulling and husking operations are repeated twice, when the rice is finished, two seers (4 lb.) of paddy usually produce one seer of clean rice. The husks of the first hulling are used either as manure or are fed to the oxen and ponies. The hullings from the final operations are given to milch cattle.

The hulling process often proves to be crude and inelastic, especially if the weather is inclement, when these operations have to be discontinued. For this reason the mortar is sometimes roofed over. This is an improvement, but even then is not so convenient as that prevailing in the plains. The rice-fields are often situated near perennial streams, so that if the hulling were done by the water power the women would be spared a great deal of drudgery.

CHAPTER XV

AGRICULTURAL PESTS AND NATURAL OBSTACLES

THE hillman labours under serious disadvantages. His crops, as well as his cattle, are liable to destruction at any time by the many natural enemies and agricultural pests that threaten him. In this respect he is singularly unfortunate, as these obstacles and pests continue to trouble him even when he migrates, and a considerable part of his time and energy is spent in devising ways and means to combat and overcome them. Like his other activities, these devices bear the stamp of the environment. Below are described some of these peculiar pests and the hillman's methods of fighting them.

The wild pig is primarily a plant pest. It is a permanent resident, and does not migrate to the Bhabars. Among the numerous wild enemies of the cultivator it is one of the "big four," the other three being the tiger, the leopard, and the bear. It can thrive as high as the main Himalayan range, and is found up to an altitude of 12,000 feet. Its favourite haunts are those sub-Himalayan terraces which adjoin an oak forest, or places where it can find safe cover. It travels in herds of five to twenty-five, and invades the fields in the dead of the night. But during the monsoon months of July and August, when the thick growth of the crops and other vegetation gives it safe cover, it becomes bolder, and begins to raid even by day. It is often found in fields growing *phangora* or *madua*, but its favourite foods are potatoes, yams, maize, rice, and sugar-cane, hence enormous damage is done to these crops. Fruit trees are comparatively immune from its ravages. Its fecundity is well known.

The only effective means of protection against the pig is to guard the fields throughout the night. A hut is erected in a central position in the fields, and a man is stationed there. He keeps a big fire burning before the hut, and scares the beasts by occasional shouts, or by beating tin cans. Sometimes, when the fields are far removed, or when the herd is especially dangerous, the hut is built on a wooden platform some 12 to 15 feet above the ground, and supported on

poles This precaution saves the lonely watcher from the attacks of some infuriated boar Sometimes, when the cultivator cannot afford to spare a man as a watcher, or when the fields attacked are near the homestead, two or three empty kerosene tins are tied together on a string, which runs through one of the windows of the house The string is pulled now and again, and the noise thus made drives the beasts away In distant fields pieces of tin are tied to a tree, and when the wind blows they clash together and alarm the animals

In some places deep ditches, 25 to 30 feet in length and 5 to 10 feet in depth, are dug at the entrance of the field and overlaid with a thin layer of grass and sticks, so that the existence of the ditch is concealed The pig, mistaking the ground in front to be safe, treads on the covering and falls into the ditch, to be caught in the morning Sometimes a *kheda* or hunt is resorted to All the villagers collect together and surround the field, and begin to attack the beasts with their *lathis* or long wooden clubs Generally the blows are aimed at the animal's hind legs, in order to disable it before it is done to death This method is rather risky, as it will drive a boar to make a desperate attempt on the lives of the assailants, often with fatal results

Recently the rifle has been introduced, but its use is confined chiefly to very wealthy cultivators

The Himalayan black bear is more dangerous to the crops and animals than the pig Unlike the pig, it is a good tree-climber, and exceptionally keen of sight and hearing Its ravages involve the fruit trees as well as the field crops, indeed, it frequents such forests as are producing, for the time being, the greatest abundance of fruits and acorns Its favourite articles of diet are *malu* (*Viburnum cotinifolium*), *madua*, mullet, marrows, peaches, and acorns, but it does considerable damage also to other crops and fruit trees It is most active from August to October, it kills goats and sheep, and mauls a large number of people every year Its savagery is proverbial, as it invariably attacks the head and the face During the cold weather it migrates to the Bhabars, and often travels in couples or larger companies

The usual method of attacking it is to surround it and kill it with clubs But in Danpur, where its ravages are most serious, it is sometimes killed by exceptionally daring women in a very ingenious way

The woman holds a trident-like branch in the left hand, and a sharp sickle in the right, and then courageously faces the brute. As soon as it advances to attack her, and opens its jaws, the branch is pushed into its open mouth. The bear's energies are devoted to its attempts to free itself, and as it is struggling with the trident the woman strikes at its throat and neck with her sharp sickle. But this attack requires extraordinary strength, courage, and presence of mind. Sometimes it happens that the trident misses its mark, or the first stroke of the sickle is ineffective, and in such cases the assailant runs the risk of being badly mauled by the irate beast.

But in the more accessible parts the people are less courageous. It is said that the best way to save one from the attack of a bear is to run down a very steep declivity. The bear tries to pursue the escaping man, but its long hair falls over its eyes, hampering its progress and enabling the man to reach a place of safety.

It is sometimes scared away from the *madua* fields, for which it has a great fondness, by a fire of the *madua* husks which is kept burning in the fields.

Panthers and leopards are very destructive to cattle, and often attack human beings also. They kill cattle and goats when these have been transferred to grazing-grounds in the forest zone. They often break the doors of the cattle-sheds by jumping against them, and when they cannot do this they break in through the roofs. Their ravages are increased during the winter months, and especially during the waning period of the moon. The only effective way of dealing with them is to shoot them or to attack them collectively with clubs. In many places the people feel themselves to be helpless, and simply wring their hands when they see their valuable cattle killed. Often these great cats are bloodthirsty but not hungry.

The tiger kills cattle and human beings alike, and is far more dangerous than the panther. When once it tastes human blood it yearns for nothing but human flesh. It is usually the older tigers that become man-eaters. They are sometimes so ferocious, and the number of their victims is so great, that handsome rewards are offered by the State for their destruction. They are often bagged by professional hunters. Sometimes a party of courageous hillmen succeed in killing them with stones or clubs. But with the gradual spread of cultivation

and the increasing density of population these beasts are withdrawing into the recesses of the forests

The porcupine is a native of the sub-Himalayas, and never found above 8,000 feet. It lives in burrows, caves, and crevices amongst the rocks during the daytime and emerges only at night. It is a great pest to potato growers and garden cultivators, potatoes, yams, and vegetables being its favourite food. It invades chiefly the fields near the homesteads, either singly or together with its mate.

The most effective way of killing it is to find its cave, and suffocate it by burning green pine-needles at the chief entrance, all the other outlets being made airtight with stones and mud.

Where the cave is difficult to find (and the porcupine travels miles from its lair), large gins are set. But if its leg is caught the animal will bite it through and escape.

Sometimes at the chief entrance to the fields a deep ditch is dug and carefully covered with twigs and leaves. All the other inlets are carefully fenced, and the animals seeking entry fall into the ditch. Such ditches contain sharp pointed stakes which pierce the animal's body as it falls. Or sometimes a chaplet of mango-stones is exposed. The porcupine relishes these extremely, and passes the whole night in licking them, and when the morning comes it has little time to escape.

Another way to deal with the porcupine is to blind it temporarily with the dazzling glare of bundles of torchwood, and then attack it with clubs. Its hinder parts are almost invulnerable; the only undefended part is the head, which it withdraws amidst the erectile quills of its body when attacked. It is very difficult to kill, as it attacks the strikers with its arrow-like quills. When killed its flesh is consumed by the villagers.

Large herds of Himalayan monkeys roam throughout the district, and make constant raids on the gardens, tearing up and devouring flowers, fruits, and vegetables in the most destructive manner. The only effective method of driving them away is to follow them up with two or three mongrels, which frighten them by chasing them and barking.

The *langoors* are abundant in the Tarai and the Bhabars, and are a great nuisance, eating fruits and vegetables alike, and often they

get the first pick of the produce. They are distinguished from the ordinary brown monkeys by the black coloration of the face and body, they are also larger, and have longer tails.

The *sambhar* (*Rusa aristotelis*), the *kakar* (barking deer, *Cervulus aureus*), the antelope, and other deer also do a great deal of damage to the crops, both in the hills and in the Bhabars. Their ravages in the forest regeneration areas of the Bhabars have confronted the Forest Department with a novel problem. Great numbers of deer are destroyed yearly both by men and predatory animals.

In the mountains the barking deer is most common in the oak forests. It grazes in the neighbouring fields. The best method of scaring it is to tie strings across the fields at some distance above the ground, then it will not venture to come near them.

The elephant is found only in the Bhabars, where it destroys the forests, and especially the bamboo thickets, by browsing on the tender shoots and trampling the maturer plants. During the runs it often destroys the Bhabar crops wholesale. It cannot be killed without the special permission of the State.

Besides the larger cats and the bears, wild dogs, hyenas, and wolves also kill many domestic animals, specially sheep and goats.

Among the inanimate enemies of the cultivator, excess of rain causes the greatest damage. Landslips and avalanches come in its train and bury everything beneath them. Nothing effective can be done to prevent the thousands of landslips occurring yearly, caused primarily by the rains, but released by all sorts of chance agencies. The fall of a tree, the loosening of a rock, the formation of a pool of water, may be the immediate occasion of a landslip.

The smaller landslips not only destroy the standing crops, but also damage the permanent terraces. But the larger avalanches of rocks and soil may even change the course of rivers, burying everything—human beings, cattle, and crops—beneath them, and changing the details of the map. The Nain Tal Brewery slip of 1924 belonged to the latter class.

Another natural calamity is the hailstorm, which occurs during the summer months, and destroys all the standing crops and fruits. Thunderbolts, floods, and natural forest fires also cause enormous losses of animals and crops.

The extent of the damage to crops and cattle from these destructive agencies is very difficult to estimate, but this much is certain that it is very considerable. On an average, some 200 persons are killed by them every year. The number of people maimed, mauled, and injured is unknown. Usually the more densely wooded parts with a northerly aspect, and cultivated tracts near dense forests, suffer most severely.

CHAPTER XVI

AGRICULTURAL IMPLEMENTS OF THE HIMALAYANS

THE hillman's implements, like his system of tillage, are the products of the environment, and are very well adapted to the region. They are few in number, and all of them, excepting the water-mill, are very simple and inexpensive. The cultivator's equipment usually consists of a plough, a hoe, an axe, a sickle, and a large bamboo basket.

The plough is of necessity very light, and has a small ploughshare, as the cattle are small and unable to plough deeply. Darling's description of the Punjab plough as "a half-open pen-knife" befits the still smaller size of this implement, which does no more than scratch the soil. In design and construction the Himalayan plough resembles that used in the plains.

The implement second in importance is the hoe. It is a small iron hook with an oaken handle barely a foot long. It will last for nearly a season, and costs about 4 annas. Although it is utilized in every stage of tillage, its chief use is to extract weeds and loosen and stir up the soil.

The sickle is the indispensable instrument for the woman worker, and is even known as "the woman's implement." Every woman, even when on her way to a fair, carries it hanging at her waist. In shape it resembles the sign of interrogation, ? A thin iron hook, the inner edge of which is carefully sharpened, is fixed into a cherry-wood or *ghingaru* handle about 6 inches in length. It is used for cutting grass and vegetables, and reaping crops, and for destroying rank vegetation. In case of emergency it is even used for killing bears, pigs, and snakes. It protects its owner as the sword protects the swordsman. A sickle lasts for about a year and costs about 6 annas (6 pence).

The *barath* is the giant sickle, larger, stouter, and heavier than the other, and with a longer handle more like that of a scythe. The hillman uses it for cutting the thorny bushes that grow among his fields and terrace walls and for hewing boughs from tall trees. Its use is chiefly confined to the stronger sex.

The *kankat* is a Y-shaped stick, often used with the sickle in cutting thorny bushes and nettles. It is 2 to 3 feet in length, and has a fork at one end. The fork holds the branch or bush to be cut, and prevents its thorns from recoiling upon the cutter.

The *sulyatha* consists of a long wooden pole and a rope, and is used for bringing in hay and grass from the jungle. The rope, twice the length of the pole, is fastened to the top of the latter, and the bottom of the pole is pointed in order to pierce the bundles of grass. During the rainy season ten to fifteen bundles of grass, or in winter and summer some twenty to twenty-five, are transfixed by the pole and tied securely by the rope. The two ends of the rope, when tied, are held in either hand, and the load is carried over the back. When it is raining the bundles of grass act as an umbrella and save the grass-cutter from a wetting. The *sulyatha* is used chiefly by the men, but in Askot and Darma by the women also.

The *chatyur* is a kind of leaf umbrella. In shape it resembles a large bamboo basket, but is very much lighter in weight. It consists of a circular bamboo frame interwoven with broad dry leaves like those of the *sal* tree. During the rainy season the cultivators wear it like a hat. It enables the hill people to carry on with their field-work in spite of the heavy rain. Unlike an umbrella, it has no handle and cannot be folded. It will last three years or so, and costs about a rupee.

The *topo* serves the same purpose as the *chatyur*, but is shaped like a great fool's cap. It is worn like a cap, and protects the back as well as the head, on account of its length. Its construction resembles that of the *chatyur*, it costs about half a rupee.

Various sticks and ropes are used in picking fruit or breaking fuel from the trees. A long stick with a crook at one end, or a sling consisting of a rope with a stone attached to one end, are the implements generally used for collecting dry fuel without climbing the trees.

The water-mill is the primitive power plant of the Himalayans. It is used throughout the Himalayas for grinding grain. All the numerous perennial streams in the different valleys of the district have been harnessed, and mills have been erected on their banks.

The water of the stream is led along the mountain-side in a leat or head-race. When it has been brought to a point which will admit of a

fall of 8 to 10 feet, it is run through a wooden flume on to the water-wheel below. Sometimes the natural current of the stream is enough to work a mill-wheel, and in such a case the mill is built on the main stream. But the stream, as a rule, is subject to periodical floods during the excessive rains of the monsoon months. These floods often wash away the mill, which stands amidst the boulders and gravel of the bank, and necessitate its re-erection during the winter.

In order to safeguard the mill against the periodical floods, and in cases where the natural rate of fall is insufficient, special leats or head-races, similar to the irrigation channels, are constructed, and the mill is built well above flood level, amidst the irrigated fields, at a point where the requisite head of water can be obtained.

The water-mill consists of a small two-storied structure. The principal chamber forms the upper story, and in the chamber below this the mill-wheel is mounted. In cases where the supply of water is abundant two or more mills may be erected side by side and fed from the common channel by separate wooden flumes. On a particularly favourable stream, like the Kosi or the Gagas, a dozen mills may be found within half a mile—e.g. near Someshwar and Bansuliseri—the mills are simply stepped below one another: the same water does duty time after time, flowing downwards from one mill to the next.

The millstones are always mounted in the upper chamber, but the mill-wheel and the regulator are housed in the chamber communicating with the mill-race.

The water-wheel is built upon a pear-shaped or elliptical hub hewn from a tree-trunk. Such wood is generally chosen as is not readily affected by the action of water, deodar, for example. Round the thicker end of the hub some twenty wooden blades are set, like the blades of an electric fan. This primitive turbine is about 3 feet in diameter.

Into the thick end of the hub is driven an iron bar, which acts as a pivot. This pivot rotates in a polished stone bearing, which is bedded on a plank about one foot in width and three in length. The motion of the turbine is communicated to the upper millstone by a vertical shaft. The upper half of this shaft consists of a thick iron rod some 2 feet in length; the lower half is of wood. The iron rod passes through

the floor of the upper chamber and the nether millstone, and is keyed to the upper stone

The two millstones are about 2 feet in diameter, and are generally something over 2 maunds (160 lb) in weight. Each is cut from a single stone, the grinding surface is covered with radiating ridges, by which the flour is pushed from the centre to the circumference. The stone of which they are made must be easy to cut and shape, it must support a considerable breaking strain, and resist wear and tear. Such qualities are rarely combined, and whenever they are found the people of that locality monopolize the trade in millstones. The two places best known for their millstones are Khari and Sananain. A pair of stones usually costs between Rs 20 and Rs 30, but sometimes, if the stones are very good, they may fetch as much as Rs 100 a pair. Two sets of stones are often kept in the mill, a heavy pair for the rainy season, when water is abundant, and the light pair for times when water is scarce.

The regulator consists of a lever which slightly raises the upper millstone and increases the gap between the two stones. The gap is increased for coarse grinding and decreased for fine milling.

The mill is fed through a hole in the centre of the upper stone. As this stone revolves over the nether stone the grain settles down between the stones and is milled. The mill is fed automatically through a spout in the bottom of a funnel-shaped hopper which is suspended above the stones. On either side of the spout small wooden links are fixed. These links drag on the surface of the upper stone, chattering as it revolves, setting up a vibration which prevents the spout from becoming choked. Their number regulates the rate of delivery. It varies, but usually four at least are necessary, two on either side of the spout.

The length of the wooden flume which runs from the mill-leaf to the water-wheel varies from 8 to 16 feet, according to the volume of water to be conveyed. At the upper end it is nearly 6 inches in diameter, but at the lower end, where it approaches the water-wheel, it narrows down to 2 or 3 inches. Its depth varies from 10 to 12 inches. It slopes steeply, delivering a smooth and powerful jet of water.

When the mill is not working, the water is diverted from the flume

by a sluice a little way upstream, through which the water is allowed to flow back to the main stream. A stopper, consisting of a wooden mallet, is thrust into the broad mouth of the flume, stopping the passage of water. This device is also used for regulating the flow of water, a number of more or less tightly fitting stoppers being provided.

The miller, besides attending to the mill, collects the milling charges from the villagers who use it. The charge for grinding two seers of grain is a small quantity of flour, usually enough for an ordinary loaf. This charge amounts to three seers per maund. A good mill is able to grind two or three maunds daily, and yields a fair profit to the owner. The miller, of course, does his best to prevent the erection of any other mill in the immediate neighbourhood, which may diminish his profits. The milling charges are now sometimes paid in cash, amounting to about half a rupee per maund. In the case of a public mill no charge is made.

Mills are often worked jointly by the descendants of the original builder, though they may be allotted to one family by a private settlement. They can be sold like any other property.

There are four kinds of mills. The commonest are the permanent mills situated on perennial streams like the Kosi or the Gagas. These run usually all the year round, though during the rains their income is considerably reduced, owing to the erection of temporary mills. They lie idle only for a fortnight during the transplanting season, when all water is diverted into the fields for irrigation. An ordinary mill of this class represents an investment of about Rs 150.

Two or more mills worked by a common head-race are called "twin mills." They are housed in the same structure, the water being divided into two equal parts by a wedge-shaped stone fixed in the channel immediately above the wooden flumes. A little way upstream above this stone a wooden harrow is fixed across the channel. This prevents the larger stones, etc., from passing into the flumes. Examples of such mills are found only where the flow of water is comparatively strong, e.g. in Deghat and Karchula on the Banau, or in Bageshwar. In a very few places, like Kaihargaon, near Tamadhon, as many as five mills are stepped along a single channel.

During the rainy season numbers of temporary monsoon mills, similar in construction to the permanent ones, are erected. As soon

as the rains cease these seasonal mills become useless. But during the rains, when the head-races of the permanent mills are washed away, they prove very useful.

Mills in the Bhabars are like the permanent mills of the hills in structure, but larger. Their stones are three times as large as those found in the hills. They are less numerous than the latter, and grind a considerably larger quantity of grain.

The district contains approximately as many mills as there are villages.¹ Owing to the large number of mills, disputes often arise among the villagers, in respect either of water rights or of the damage caused by the mills to the irrigated fields. Water rights are determined according to priority of use, but the claims of irrigation have precedence over those of the mills.

Mills adjoining cultivated land, with their leats almost on a level with the stream-bed, as on the Giwars, cause great damage by their diluvial deposits, as during the monsoon months the water in the leats is diverted to the adjacent fields. In such cases the disputes are determined after an inspection of the damage.

Every mill-owner pays a yearly rent to the Government, which is utilized for the betterment of the rural area by the District Board. The rent is assessed according to the perennial or seasonal nature of the mills, the flow of water in their head-races, and their situation. Those that work throughout the year pay Rs 6 a year, the monsoon mills Rs 2 to Rs 3, those that do not work during the rainy season Rs 4, and the twin mills Rs 10 to Rs 12. All the public and charitable mills are exempted.²

¹ There are 5,273 villages and 5,000 mills.

² The water-mill figures very prominently in the sayings and folk-tales of the hill people on account of its close association with their daily life. To say that a man is grinding corn means that he is sitting idle, and to say that there is water in his mill-leat, implies that he is passing through a period of prosperity. The local gossip also is passed on by the miller.

CHAPTER XVII

HIMALAYAN CATTLE

TRANSUMANCE AND HAY-MAKING

THE hill cattle are remarkably small in size, smaller than the smallest cattle of the plains. Nevertheless, they do a fair amount of work for their size. They are as active and sure-footed as the Bhotiya goat, and have developed a marked resistance to cold. The short neck and the low carriage of the head are their most noticeable features, and these in reality constitute an adaptation to the mountainous environment. They are often black or white in colour. But they are wretched milkers. Even the buffalo, which is the chief source of milk, is unable to yield more than two seers a day, the maximum daily produce of the cows being only one seer.

They are usually tied during the night in the lower portion of the hillman's dwelling, known as *goths*, but more recently separate sheds (*gwars*), at some distance from the dwelling-house, have been built for keeping them. These sheds are littered with dry leaves—mostly oak-leaves and pine-needles—on which the cattle are bedded. During the winter, every available aperture is plastered up, in order to keep the cattle warm.

During the daytime they are driven to the neighbouring jungle, but the cow buffaloes are usually kept at home and stall-fed by the women-folk, for if they are driven daily to the neighbouring jungle many are killed by slipping on the abrupt slopes, which the dry pine-needles make as slippery as ice.

According to the latest Cattle Census (1912), the district contains the following cattle population:

Buffaloes and Bullocks	Cows	Young Stock	Buffaloes	
			Bulls	Cows
164,379	200,823	131,498	3,212	101,745

They suffer severely from the ravages of the cattle-plague (rinderpest) The average rate of mortality here is greater than in the plains Foot-and-mouth disease is also very common The remedies adopted are not very successful, but recently the effects of vaccination and segregation are being appreciated and proving useful

Like the Alps and the Pyrenees, the Himalayas have developed certain characteristic methods of cattle-rearing and fodder preservation Transhumance, or the seasonal migration of cattle to the high pasture zones, is one of these methods, and is very widely practised in the district

The practice of transhumance here owes its existence to the peculiar characteristics of the district The high pastures during the winter months are very cold, and often covered with snow, which destroys their vegetation Hence during the winter months they are deserted, all life being concentrated in the villages of the valleys, where the climate is more genial and the available stock or fodder is sufficient for the cold season But as the summer approaches conditions begin to change The temperature rises, and the growth of vegetation is rapid Fresh blades of grass and tender leaves are available in the forests Before long hill-tops are warm enough for the cattle to live in the open In the valleys, too, conditions are changing The stock of fodder preserved for winter use is almost exhausted, the scarcity of water is beginning to be felt, and grazing in the adjacent jungles becomes more and more difficult with the advance of the hot season The cultivator finds that it is becoming difficult to keep his cattle in the village

The practice of migration is encouraged also by the difficulties of communication, which make it impracticable to carry the hay from the distant pastures to the farms below. Hence the cattle are driven up to the hill pastures instead The grass that grows in the homelands, when the cattle are up in the pastures, is carefully preserved as provision for a "snowy day"

The cattle pastures are usually situated amidst the great oak forests, between 8,000 and 10,000 feet above sea-level. During the summer months they provide ideal conditions for cattle rearing Hence by the end of March the cattle are sent off in charge of a few herd-boys The exact dates of the upward movements differ, and are

determined by the distances to be travelled, the available stock of fodder in the village, the number of herd-boys that can be spared, and the agricultural needs of the cultivator in manure and plough cattle

Where the distance to be travelled is only a matter of a few hours' or a day's journey, the cattle are sent away from and driven back to the village four times a year. They first go up to the nearer pastures in March, and return in May, when more men are needed for harvesting the wheat crop and sowing paddy, and more cattle for ploughing and manuring. The wheat straw serves as the fodder on which the cattle are fed for about a fortnight.

The cattle go up again in June, when the *kharif* sowing has been completed and the grass has once more grown on the grazed slopes. This time they gradually move on to the more distant pastures as the season advances, and they remain there longer. The homecoming from this trip coincides with the annual festival of the *Haryala* in the village, which is celebrated after the rains have set in. The cattle no longer find any difficulty in getting fodder. There is plenty of grass near the village lands, as the humidity has been increased by the monsoon rains.

The third trip is undertaken in August, when there is no agricultural labour for the men or the cattle. During this trip the scarcity of grass is no longer a problem. The cattle are driven to the pastures because the grass in the uplands is far more nourishing and succulent. This trip is a kind of cure. The return is timed a little before the *kharif* harvest.

The fourth and the last trip is taken immediately after the harvesting operations are over, and the final return begins when it has grown very cold in the pasture zone and the grass is no longer growing.

But all these four trips are by no means necessary for every villager. Some, who can spare enough hands, go for the first time in March and come back in October. In such cases the pastures are several days' journey from the homelands. The best known of such distant pastures are those of Dhakuri in Danpur and Dudatoli in Garhwal. In Dhakuri the herds are taken right up to the glaciers. Such is the renown of this pasture that even Gujars from Kashmir have made their way to it with their buffaloes.

A little ceremony attends the actual march. The rate of the movement is determined by the size and composition of the herd and the proportion of young stock which it contains. In the case of buffaloes it is very slow, but when cows are driven it is fairly rapid. As many people as can be spared go with the cattle. Men with strong constitutions who are accustomed to hardships are given preference. The old, the infirm, with the boys, girls, and young children remain at home, as do the pregnant women and those who have very young children. Of the people who accompany them, the men constitute the majority. Their principal work is to act as herdsman and to build temporary sheds (*kharaki*), they also utilize their spare moments in manufacturing wooden implements. The women act as grass-cutters.

These people are sometimes relieved by others who come up from the villages. The herd-boys, while they are in the forest, are supplied with rations brought up from the villages. These consist chiefly of wheat or *madua* flour. They seldom get any vegetables, but they can consume as much butter and milk as they like. A system of communication between the villages and the herders in the forest is maintained. Members of different families now form themselves into a sort of joint family for messing purposes. They lead a nomadic life, and a single blanket is sufficient for bedding.

As soon as the pastures are reached, preparations are made for the construction of the temporary sheds or *kharaki*. Each group of villages in the same valley has a common pasture or *khata* assigned to it, over which it exerts communal ownership. In the midst of this pasture (*khata*) a level spot is selected, after considering its resources in respect of fodder, nearness of water, drainage facilities, and safety from wild beasts. Usually the summit of a tract of rising ground is preferred. When the selection has been made the men build the sheds for their respective villages. These are not unlike the *chalets* or *saeters* found in Switzerland and Norway. As the sheds are only for temporary use, they are not luxurious. They are simply huts with roofs of thatch and walls of wattle or timber. The frame consists of wooden poles, which the men cut from the adjacent trees. The poles are lashed together and interlaced with branches. Sometimes plank walls 8 to 10 feet in height are built, and the door is made small as a precaution against beasts of prey.



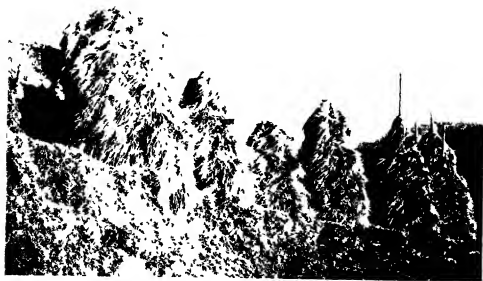
SUMMER-TYPE CATTLE-SHEDS OR *KHIRIKAS*
In the high mountain pastures



A *GHUNGUTLA KHARAK*
With a group of herd-boys busy with their pipe



STACKS PILED ON STANDS



HAY STACKS PILED ON A SUNNY SPOT

There are four kinds of these sheds. The commonest is the rectangular structure with a pitched roof.

The second kind is the *ghungtia*. It is comparatively easy to construct, and looks like a tent. One Y-shaped pole is pitched in the centre, and some five to ten poles are then arranged round it, slanting at an angle of 45 degrees, one end resting in the fork and the other on the ground. They are then interwoven with branches of oak or pine, and the whole is thatched with pine-needles. As a rule, these sheds are replaced annually.

The third kind has a pyramidal roof, but is otherwise similar to the first.

The fourth kind, or winter shed, has walls of planks or stone. The chinks are plastered with mud and cow dung.

The shed is shared by the young stock and the cowherds. Sometimes also a newly calved cow is tied inside it. In the middle of the floor is the hole for the fire where the bread and vegetables are cooked and the milk boiled, but rice is never cooked on it. There is also a cupboard, sometimes underground, but often under the roof. It is made of rough wooden planks or with stone slabs. In this are kept cheese, butter, milk, and other stores.

In the evenings all the cows are tethered near the sheds, but the buffaloes are left at large. They are allowed to graze all night, since the leopard is unable to kill them.

Sometimes there are two or three sets of these sheds, owned by a single village, but distributed over different pastures. As soon as one pasture is grazed the cattle are driven to the next one. Every pasture is left vacant in turn, in order to allow the grass to revive. Usually the nearer pastures are grazed first, and the remoter ones later, when the rains set in. This change in environment, temperature, and humidity influences the flow of milk in the milch cattle. The manure of the sheds is utilized in a kind of intermittent cultivation, which the people in charge of the cattle practise near the sheds. Small patches of jungle land are cleared and sown with potatoes and vegetables.

During the period of transhumance the milk of the cattle is generally turned into butter. Occasionally some of the curd is sent to the village. The buttermilk is consumed by the cattle. The herd-

boys do not sell the milk, but they will gladly give to any passing stranger

A few cattle are exchanged during the grazing months in these pastures, where cattle from different villages are assembled, thus facilitating exchange by providing a wider choice

The herd-boys, in their leisure hours, manufacture certain implements, the raw material for which is easily obtainable from the forest trees. All such wooden implements as harrows, clubs, and sticks, hafts for axes, and handles for hoes and sickles are prepared here. In places where fibrous plants are found ropes are made. Fine slivers of pine, known as torchwood, are collected for lighting purposes and are sent to the permanent village.

The cattle remain throughout the rainy season in the high remote pastures, but on the advent of the winter these heights are subject to dangerous snowstorms. The rude, temporary structures no longer provide sufficient shelter. The herbage becomes more scanty every day, and the cattle begin to show a desire for a more congenial climate. The very factors that made the highland pastures an ideal resort are no longer present, but are now to be found in the lower valleys. Moreover, the services of both the herd-boys and the cattle are required on the permanent farms, the former to help in collecting the *khari* harvest, and the latter to fertilize the fields for the *rabi*. The cattle, too, derive profit from the remnants of grass left in the hayfields and on the terrace walls. The homeward descent from the more distant pastures begins in September, and is a quick journey, as very few halts are made. The homecoming is marked by a little ceremony of welcome, when rich food is offered both to the herd-boys and to the cattle.

The chief pastoral regions of the district where transhumance is practised are Danpur, Shor, Sira, Boraraus, Athaguli, Doras, and Tikhuns, the cattle from which resort during the summer months to Dhakuri, Bhatkot, and Dunagiri. The people of the western parts of Pali go to Dudatoli in Garhwal. The butter manufactured in these places is sold during the winter in Almora, Ranikhet, and the Bhabar marts.

The practice of transhumance is tending to decline. The pressure of an increasing population is bringing more and more forest land

under cultivation. The number of the cattle is also increasing. Individualism in place of communal ownership is asserting itself. Roads are penetrating the forest region and economic dependence is increasing day by day. Moreover, it is the policy of the State to discourage the practice.¹

Fodder consists chiefly of hay and straw. During the winter the cattle are fed with paddy straw. It is said that it has heating qualities and keeps the cattle warm. But it is difficult to preserve this straw for any length of time, so that efforts are made to get it consumed as quickly as possible. Moreover, in summer it does not suit the cattle, but causes illness. It costs about half as much as hay.

During the summer months the cattle are given hay or wheat and *madua* straw mixed with green leaves. Grain and salt are seldom given, but the whole stock of oil-cake is fed to the milch cows and the plough bullocks.

The chief problem for the hill cultivator is to secure fodder for the winter and summer months. Hence, during the latter half of the rainy season, when the herdsmen are away in the pasture zone tending the cattle, the men and women who remain in the homelands are busy preserving grass for fodder. The extensive pastures near the homelands are carefully fenced, either with stone walls or with thorny bushes, and the grass is allowed to grow for hay. This is cut in October and stored for the winter. Examples of such hayfields are seen near Kairarau, and even in distant Askot.

Similarly, in some high-lying tracts in the pasture zone, where the difficulties of communication are not insuperable, a village raises a hay crop, leaving a particular area ungrazed by mutual agreement during the pasture season. In the autumn the whole of the villagers mow the hay.

But in the more populous and more cultivated tracts all the soil has been tilled, and no such areas are available. The villagers, pressed by hard necessity, often deliberately let a few patches of arable ground lie waste for grazing. A measured plot of land, subscribed by the entire village community, is also kept as a grass preserve, and constantly watched. Here the hay is cut at fixed periods by mutual arrangement.

¹ The forest settlement of 1912-15 greatly curtailed the grazing rights of the villagers in the forests.

This means considerable self-denial and forethought on the part of the village community

Places inaccessible to goats and cattle are natural preserves for raising crops of hay. Such, for instance, are the perpendicular precipices, where the women, often at the risk of their lives, climb and cut the grass a handful at a time

Hay is also grown on the terrace walls, the short uncultivated slopes between the fields, and the *katil* lands, where it is mown after the paddy harvest

Where pastures are very scarce, e.g. in Salts, Chaukots, and G1wars, certain trees are grown and preserved as fodder. The most valuable of such trees is the *bhyunl*, which is grown along the terrace walls or on the short slopes between the fields. Its branches are fed to the cattle from November onwards, and by careful contriving they can be made to last until the rains set in.

Oak-leaves also are fed to the cattle, the tender leaves gathered in March and April being regarded as an especially valuable fodder. In addition to all the available green shoots and leaves, including those of the mountain hawthorn, *ghingaru*, and mulberry nettles are eaten by the cattle during the months of fodder scarcity.

In order that the tender green of the sprouting grass may be available for the cattle during the early spring, and so that the forests shall be accessible to them, the Himalayans burn their forests at the close of the winter every year. The pine-needles, which render the ground as slippery as ice, burn readily, and their ashes provide a valuable manure for the grass, which grows very rapidly in the spring. The Forest Department used to prohibit this practice, but it has been revived of recent years in certain selected tracts of forest.

The winter days in the Himalayas are short, and the sun shines only at intervals. Heavy dews and frosts and many cloudy days make it imperative that the hay should be mown while the days are still long and the weather sunny. Immediately the *kharif* harvest is over the grass preserves are mown by the women with their sharp sickles, and the hay is carefully spread on the terrace walls¹ to dry. All day

¹ Such is the skill acquired by the women in mowing that they can cut grass only 2 inches in height.

long the hill-women and their children turn and toss it at intervals, so that every part of the grass blades may get equal share of sunlight

Sometimes horizontal poles are set up, and the hay is hung on these poles in order that it may be thoroughly exposed to the sun and wind and dry quickly if it rains

Sometimes the sheaves of hay are formed into tripod-like structures, by piling three of them¹ together and leaving them to dry This system does away with the necessity of constant turning and tossing

The most characteristic method is that in which hay is stacked for the period of stall-feeding After being cut, it is tied into sheaves and piled into pyramidal structures, which diminish in girth as the height increases² The sunniest spots to be found on the hill-side are selected, where wooden poles some 20 to 30 feet in length are set up, and platforms or stack-stands are built round them The sheaves are piled round the pole, resting on the stands The stands may be circular or rectangular in form Their purpose is to raise the level of the stacks so that the moisture from the soil cannot injure the hay

Sometimes no such stands are erected In places where timber and trees are not easily available, as in Chaukot, a forked pole is set up, the fork being some 5 to 6 feet from the ground On this fork thorns and branches are arranged and over these are piled the bundles of hay The height of the fork from the ground protects the hay, not only from damp, but also from the attacks of stray cattle The stack hangs half-way up the pole, and the fork being invisible people often wonder how the bundles remain suspended Between Pachpola and Sarainkhet the fields are all studded with stacks of this type, which economize timber as well as labour

In places like the Doras the stacks are piled on rocks Sometimes the surrounding trees near the homesteads or the fields are peculiarly suitable for supporting stacks Such trees as have serviceable forks are used, especially the oak and the medlar The trunk serves as a pole and the fork as the stand But in some cases either of these two is absent Sometimes the roofs of the houses are utilized as stack-stands, and the stacks in such cases are piled without a central pole.

¹ As rifles are piled on the order to "pile arms"

² At a distance they have a vague resemblance to deodars.

Every stack requires two men to construct it. One man hands up the bundles of hay and another arranges them round the pole, so skilfully that as he goes on piling them the girth decreases, until at last the whole looks like the spire of a temple. Not every man is able to do this. Generally speaking, a stack contains from 150 to 500 bundles. There are two methods of arranging the bundles. By one method the bundles are arranged horizontally in layers round the pole. The length of the bundle becomes its radius. This type of stack is of small dimensions. In the larger stacks bundles are arranged radially round the pole, and are surrounded by a ring of other bundles which lie tangentially, so that the radius of the stack is the length of a bundle plus the breadth.

The well-built stack should allow no water to penetrate it. The rain should run off its surface as off a roof, for if it penetrates the surface the hay will be spoiled and mildewed, and the cattle will not eat it.

The winter and summer rains in the hills are very scanty, and the hay thus stacked does not appreciably deteriorate. The stacks serve as ideal stores for fodder and are peculiarly adapted to the hill country. All the villages are studded with them during the winter and summer months, but as time goes on their number begins to decrease, until at last, at the beginning of the rains, not one is left.

CHAPTER XVIII

THE WINTER EXODUS TO THE BHABARS

('EATING SUNSHINE')

THE tract known as the Bhabars consists of the narrow strip of level country at the foot of the hills. It lies between the hills proper and the Tarai. From November to June it is almost waterless. Except for a few perennial streams, the watercourses disappear in the thirsty porous gravel deposited by the streams themselves. The mountain streams, loaded with gravel and other detritus, find themselves on a level surface when they reach this tract. The furious velocity which is their chief characteristic in the steep hill valleys is changed to a slow meandering flow, and being unable to carry the coarse material farther they deposit it at the foot of the hills. The gravel deposits divide the river beds into many smaller channels, in which evaporation is more rapid. The chief perennial streams, which are not lost in the subsoil of boulders and gravel, are the Kosi, the Gola, the Nandhaur, and the Jagdhar.

Rain in this tract falls in excess during the monsoon season. This humidity, coupled with the tropical heat and the alluvial formation of the region, encourages the growth of dense, luxuriant vegetation. Hence most of the land is covered with tropical forest. It is sufficiently warm even during the winter months, so that the vegetation continues its growth even in the cold season. The climate, though malarious, is not unhealthy during the dry months i.e. from November to June.

Between November and March the cold in the hills is severe, and heavy snow falls. All the vegetation dies, and it is very difficult to feed the cattle. Moreover, the winter months are months of agricultural idleness, when every hillman seeks employment. The people are comparatively poor at this time of the year, and the cost of living in the hills increases on account of the intense cold. In order to solve their difficulties, the hillmen seek a more congenial climate, where, besides "eating sunshine," they may expect some prospects of trade,

or profitable employment, and inexpensive living. These they find in the Bhabars, to which they all migrate for the winter. The men of the middle and northern parts of the hills, and especially of Pali-Pachau, Kali-Kumaon, and Phaldakot, vacate their hill villages immediately after the *khari* harvest is completed, and march down to the Bhabars, accompanied by their families and their cattle, and live in straw-thatched huts amidst the forest clearings.

Preparations are made for the march some eight or ten days in advance. The village astrologer fixes the auspicious day of the actual march, when abundant meals are prepared in the morning. After these have been eaten all the men and women dress themselves in their gala dresses, and the red powder is applied to their foreheads. Every migrant bows before the village god, and the head of the family places a small sum of money in the shrine. Every mother of an infant in arms equips herself with a branch of the nettle plant, so that evil spirits may not harass her baby during the journey. When all these ceremonies and preparations are completed the march begins.

The migrants form themselves into groups of twenty-five or more. Usually the people belonging to the same or to neighbouring villages travel together, which makes the parties homogeneous in character. Each party consists of many entire households, travelling bag and baggage, and accompanied by their cattle.

Everybody carries his or her bedding. In the case of an able-bodied woman, all her household goods are carried on her head in a basin-shaped bamboo basket (*dala*). A general hold-all, this basket is put to many uses. It serves as a cradle for the baby, a wardrobe for the clothes, and a tiffin-basket. It contains all the requisite things for the march and for the night encampments: e.g. bedding in the shape of a blanket or a cushion, some cooked food for the children, a smoking set for the men, an axe, a sickle, some uncooked vegetables, a few utensils, a dish, a bowl, and innumerable items of paraphernalia. More recently a lantern and an empty kerosene oil-can have been added. All these things lie buried underneath the tattered cushion, on which is bedded the infant in arms.¹ A black blanket spread on the top covers everything.

The men carry their loads packed pannier-wise in hempen bags.

¹ It is far more easy to carry a sleeping baby than one wide awake.



A SCENE FROM A ROADSIDE ENCAMPMENT



THE MILLER
At the door of the mine



JOU JIBI
A general scene



PONIES FORM THE CHIEF ITEM OF MERCHANDISE
Tied in front of the Bhotiya tents

on their shoulders, and carry an axe in their hands instead of a stick

Sometimes a few bullock-carts and pack-ponies accompany these parties of migrants. The carts are full of gunny-bags, bedding, and utensils, and on the bedding sit the old, the infirm, and the children. Generally the richer people alone can afford these conveyances. The means of transport, as a rule, serve as indices of the wealth of the travellers.

During the march certain characteristic features of the hillman's life are visible, for example, the women will be seen driving the carts or riding the ponies, seated on some portion of the household bedding. Babies are carried in baskets as head-loads, or tied up and slung over the pack-animals. In some of the carts, behind the father, who holds the reins, sit seven or eight children, grouped round their mother. Kids, puppies, and calves are riding in the cart, side by side with the children. A few of the men are seen following their loaded ponies on foot, and sometimes a pony is ridden by more than one rider. Women carrying heavy loads follow or precede their menfolk, who always walk at a respectable distance from them. But recently new ideas have effected some changes, and it is not an unusual sight to see a few reformed couples walking side by side, and talking and laughing as they walk.

The cattle also march with the party, in charge of a man who is not encumbered with a load. Each party, before leaving the village, is fully equipped with all the necessary requirements for the journey, and is self-sufficient. Sometimes no meals at all are prepared during the wayside halts, as enough cooked food is brought from the village to last for the whole march.

The distance covered in a day's march is not more than 10 or 15 miles, the entire journey taking about a week. Immediately after sunset, or even before it, the day's march comes to a halt, and arrangements are hurriedly made for the night's stay. The encampment is generally near the wayside shops, but sometimes the nights are passed in the midst of the dense forest. The whole road is blocked with the people and their baggage and cattle, but as soon as a halt is called the road is deserted and the newly pitched camp is full of animation. Here a few women are seen preparing vegetables or boiling tea, there an old woman sits by the camp-fire, surrounded

by small children, yonder the men are smoking and gossiping. All the work of camp is performed by the women. There are no tents, as in a Bhotiya camp, and the men remain inactive.¹ Beside the camp-fire all the cattle are tethered to their several pegs, as a precaution against their straying, or encroaching upon the wayside cultivations, or going back to their homes in the hills, or fighting amongst themselves. What with the camp-fires and the tethered cattle, the scene is a very lively one. It seems as if a whole community is on the move.²

As soon as the Bhabars are reached the people of each village or group of villages begin to erect their respective sheds on their ancestral clearings (*goth*) in the forests, to which they resort year after year. The inhabitants of a number of neighbouring villages usually build their huts close together for mutual protection against robbers, wild beasts, and strangers.

The Bhabar sheds are similar in design and construction to the temporary sheds (*kharaks*) built by the hillmen in the high pasture zones. Every migrant from the hills is able to obtain, free of cost, every third year, the poles and thatch for constructing these sheds, provided he pays the grazing dues. In these sheds the people and their cattle live side by side.

There are four distinct classes among the people who migrate to the Bhabars. They are *Ghamtappas* or temporary residents, who work as day labourers, nomadic professional cattle-breeders, and *ghu* (clarified butter) producers, agriculturists, and traders.

The *Ghamtappas* form the first and the most numerous group. Desire for a more congenial climate, and the demand for human labour in the Bhabars, prove too tempting for this class, so that thousands migrate to the Bhabars every year. Every family in the hill *parganas* sends its own quota. Some of the *Ghamtappas* migrate singly, and some with their families and cattle. They remain in the

¹ The carts form a kind of *laager*, or defensive circle, and enclose within them the families, their camp-fires, and herds.

² But the return march is not so orderly and picturesque. The people return in small batches as soon as their work in the lowlands is finished. Everyone brings back a red earthen jar and a wheat-straw mat. As few encampments as possible are made, and there are no special arrangements as to the day of departure.

³ *Ghamtappas* are also called *Kabaris*.

Bhabars for three or four months, and are back in the hills for the wheat harvest

The three or four months the *Ghamtappas* remain in the Bhabars are very busy times for the collection and export of Bhabar produce. The demand for labour in the Bhabar forest is at its height during this season. Every able-bodied man or woman can find employment and earn a daily wage as a labourer, either in the forest or among the Tharus. The non-possession of land or capital does not handicap anybody. The work in the forest takes the form of cutting bamboo and thatching-grass, sawing timber, extracting gum, distilling catechu, collecting honey, wax, and other minor forest products, or clearing the forest fire line.

The forests are divided into plots, and are auctioned by the Forest Department for a period of two to three years, and are purchased by big contractors, who engage sub-contractors from the hills. As soon as the bidding for contracts is over, the sub-contractors or their agents go to such hill villages as migrate annually to the Bhabars and advance money to their residents. When the villagers who have accepted advances reach the Bhabars their services are requisitioned by the contractor, and they are assigned a definite piece of work. Hence immediately the villagers reach the Bhabars they mark out and encircle such forest areas as are most convenient for their work. Usually they select those tracts which lie nearest to their ancestral clearings.

The majority of the *Ghamtappas* are either hewers of wood or carriers of timber. They cut the bamboo in the forest and carry timber to the roadsides or the railway terminus.

The skilled labourers work as sawyers, and are more prosperous. They take contracts for sawing from the timber merchants, and are paid according to the number of cubic feet of timber sawn. They usually travel and work in groups of ten to twenty-five.

The *Ghamtappas* working among the Tharus are known as *dhankuttas*. They go to the houses of the Tharus and thresh and pound their grain for a small wage in kind, which they sell in the chief market-places, such as Ramnagar, Haldwani, or Tanakpore.

But on the whole the people of this group are averse to a methodical and laborious way of life. Their chief concern, as their name implies,

is to bask and hibernate and tend cattle. During the summer they cultivate the hill terraces, but during winter they work in the forests of the Bhabars.

The cattle-breeders roughly resemble the graziers of the highlands, building their huts in the forests after ascertaining the facilities for the supply of fodder and water. Their cattle-sheds are huge barrack-like structures, about 100 yards in length and 30 in breadth, in which all the cattle are lodged at night. Those of them who own very large herds simply fence off a given area with strong wooden rails and impound the cattle inside it. Unlike the highland graziers, the breeders take great care in the selection of their stud bulls.

They are divided into two classes viz. cattle-breeders and *ghu*-manufacturers. Both classes supplement their earnings by a certain amount of cultivation. The breeders own large herds of cows and bullocks (*langars*) which graze here during the months of October to June. These herds or *langars* roam freely in the forest, and sometimes mingle with other herds and stray for miles in their company. The cows, when they go astray in the forest, form themselves into a sort of defensive group. During the night, when attacks from the wild animals are more frequent, the cows may be seen standing in a circular formation, all facing outwards. In the centre of the circle are the young calves and the weakly or infirm adults. When this defensive circle has been formed neither tiger nor robber can penetrate it. Anyone attempting to enter it is assailed by the whole herd.

These herds are never milked by the owners. All the calves are at liberty to enjoy their mothers' milk to their hearts' content, and in consequence they grow up strong and healthy. They are, as a rule, hardy, but poor milkers. When they are fully grown and fit to draw the plough they are sold, and they fetch high prices, as they are in great demand among the hillmen, and also among the plainsmen of the eastern districts. They are inexpensive to keep, and particularly valuable for rice cultivation, and for places where the roads are bad and only light carts can be used.

The *ghu*-producers resemble the cattle-breeders in every respect, except that instead of leaving the milk to the calves they milk the cows themselves, like the graziers in the highlands, and make clarified butter (*ghu*). Their camps are situated in the moister localities, so

that their buffaloes may have water in which to stand and wallow. The number of cattle in a herd varies from 50 to 1,000. Some four or five owners, by combining their herds, form themselves into a sort of joint-stock company. This combination reduces the costs of management and facilitates division of labour. The *ghu* finds a ready market in Ramnagar, Tanakpore, Haldwani, Kotdwar, and other places. The net proceeds are divided according to the number of the milch cattle contributed by each shareholder.

The *ghu*-producers may be subdivided into two groups. The first group consists of temporary producers, who live in the Bhabars during four months only, but the second group, or permanent producers, live in the forest almost all the year round, except for a brief period during the rains, when they migrate to the hills to escape from the sultry climate. The permanent producers have definite plots assigned to them in the Bhabar forests.

The agriculturists are fairly well-to-do people who have two dwelling-houses. They have one up in the hills, like everyone else, but, unlike the rest of the hillmen, they have another house in the Bhabars, where they own extensive clearings. They are the original founders of some of the Bhabar villages whereof they are the headmen, and are known as *Sirgirohs*. The irrigation system in the Bhabars owes its existence to their efforts.

The agriculture practised by this group in the Bhabars is of great importance to the people of the hills, especially in years of scarcity. It is of great assistance to the famine-stricken parts of the hills, as most of the landlords are themselves hillmen, and the whole of their produce is readily available for consumption in the hills. As most of the holdings are irrigated their yield is more or less assured.

The soil of the Bhabars is predominantly a light loam, but in places near the hills it is sandy. It is worked by the tenants of the agriculturists or by the landlords themselves. The tenants are recruited either from the poor agricultural classes of Bijnor or the Tarai, or from among the migrants from the hills. The former, who are known as *Sajhis*, are skilled agricultural labourers. They are supplied with seed, implements, and bullocks by the landlords, and sometimes they receive advances of cash. In addition to their agricultural duties, they have to look after the estate during the summer and the rainy season.

In these months the climate is insufferable and malarious, and all the landlords migrate to the hills. But those tenants who are themselves hillmen work only for a short period, and as soon as the heat increases they leave for their mountain homes.

The *Sajhus* obtain a fair return from the soil, which leaves them a considerable surplus, out of which they pay their debts.

The system described above is prevalent only in the Western Bhabars. In the eastern villages the landlords lease out a whole village to a single lessee, usually a cattle-breeder from the hills. He builds his cattle-shed on the estate, and encourages his friends to do the same. When the soil has been sufficiently enriched he sublets it to a few professional gardeners from the Bijnor district, who cultivate tobacco, cotton, and other vegetables.

Nearly three-fourths of the crops are grown in the *rabi*. Mustard, wheat, flax, gram, *ganara*, and tobacco are the chief crops of this season. Paddy and sugar-cane are cultivated during the *kharif*. Mustard requires five to seven ploughings and as many levellings. It is sown in September and October and gathered in December. *Ganara* and wheat are sown in November and December and harvested in April. The *kharif* is quite unimportant, as during the period the climate is intolerably hot and unwholesome. Only a few plots are sown with paddy by the *saya* method.

The last group is that of the traders. These are recruited from the more enterprising and less sedentary natives of Pali, Phaldakot, Kali-Kumaon, and Baramandal. They act as small shopkeepers and middlemen in the various marts (*mandis*) of the Bhabars, such as Haldwani, Ramnagar, or Tanakpore. After acting as middlemen for a while they are able to amass a little capital and set up a store or a shop of their own in one of the markets.

The Bhabar market is a sort of trade depot. The markets not only provide the Himalayan villages with their annual supplies of sugar, cloth, and salt, but also act as centres for the disposal of the hillman's surplus stock of chillies, turmeric, and buckwheat. In the markets the greater part of the traders' business is done on the *painth* or special market days.

Every important Bhabar market has one or two special market days weekly, when the countryfolk flock in from miles around to

buy and sell various commodities. The "bazaar" which springs up on a market day consists of a long line of booths in which grain, copper jugs, iron pots, brooms, and innumerable other articles of daily use in the hillman's domestic economy are displayed and sold. The market-place is divided according to the various trades, and sites are assigned permanently to the different traders. Thus, all the corn-merchants exhibit their wares in one continuous block; and so do the vegetable-sellers and other traders. A brisk trade is carried on throughout the day.

In addition to acting as shopkeepers, many of the market people are also engaged in the business of trading between the hills and the Bhabars. They buy *gur* (raw sugar), salt, cloth, tobacco, and other wares for cash at wholesale prices on market days, and carry them up into the hills in their bullock-carts, disposing of them in the villages at prices which allow them a handsome margin of profit. Sometimes, instead of cash payments, they offer the hill products in exchange, e.g. turmeric, chillies, hemp, or ginger. In such cases the hill products are bought for cash. The Bhotiyas, who frequent these markets during the winter, are included in this group. Instead of carts they use their goats and sheep, laden with saddle-bags, as the means of transport.

In the Kali-Kumaon subdivision the two Palbilons, Sipti and Tallades, form a distinct group by themselves. Here the people do not migrate to the Bhabars, but are able to "eat the sunshine" in the hills. The large rivers have very deep beds at a few hours' distance from the permanent hill villages, in which the people are able to find a congenial climate for the winter months. Every villager has two houses, the one being called the *naya* or winter home, and the other the *uram* or summer home, the latter being in the main village built in the terraced lands. The *nayas* are very unwholesome in the summer and the rainy season, but are quite warm and healthy in winter. Here the villagers are able to find extensive waste areas for grazing and cultivation, and here all the features of life in the Bhabars are reproduced on a smaller scale. *Nayas* are to be found all along the beds of the rivers Panar, Sarju, Kali, and Ladihya.

The introduction of motor traffic in recent years has greatly affected the system of transport and the volume of the exodus. The

care-free march of "sunshine-eaters" has become an anxious business, owing to the hurrying motor traffic, and the responsibilities of the men in charge of the parties have been greatly increased. Fortunately for the migrants, the hill roads do not allow of night driving, and most of the cattle are driven during the night, so that by the early morning they can reach some place of safety. Rash drivers have been responsible for inflicting severe losses on the hill people, killing or disabling both men and cattle.

The bullock-carts and pack-ponies are being superseded by motor-buses. Owing to this cheap and rapid mode of transport, the Bhabar products are now readily available in the hills. The necessity of annual migrations to the Bhabars, for the purpose of making purchases, has been eliminated, and consequently the volume of the migrations has diminished.

Again, owing to the speed and comfort of the motor-buses, many of the migrants have begun to travel by them, their cattle being driven by hired drovers. This is eliminating some of the picturesque features of the migrations.

The chief advantage of this movement to better geographical conditions is that it saves the hillman from the intense cold of the Himalayas. Very few of the people are able to provide themselves with warm woollen clothing, and their thin cotton clothes necessitate a change to warmer localities. Many of them, again, are able to find employment and bring back considerable sums of money, which add to the prosperity of their native district. Their cattle, too, are saved from cold and hunger. The camp life develops a corporate spirit amongst them. Their slow and leisurely movements through the territories of different peoples enable them to pick up new ideas.

But the movement has certain disadvantages as well. The periodical exodus has a depressing effect upon the standard of cultivation in the hills. The migrants, especially in Kali-Kumaon and Phaldakot, look upon the hills as their health-resorts, and not as estates to be developed and cultivated. The standard of cultivation in these parts is very low, and the crops raised, especially those of the *rabi*, are very inferior. There is an element of unsteadiness and a lack of permanence in the efforts of these migratory people, which prevent them from paying the

requisite amount of attention to the arts of agriculture. Attempts at improvement are entirely absent. A glaring example of this tendency is to be seen in the central plateau of Kali-Kumaon. Here, as in Shor, the best agricultural facilities in the shape of gentle gradients, easy irrigation, and fertile loam are present, but, unlike Shor, owing to the migratory habits of the people it remains entirely undeveloped.

Another disadvantage is that the climate of the Bhabars and the mode of living there undermine the vitality of the people. This results in a great number of deaths every year. The survivors stand low in the scale of fecundity and average duration of life. Malaria, tropical dysentery, hookworm, and other tropical diseases cause an enormous loss of life every year, both among human beings and animals.

The migrants also bring diseases and social vices with them. They live in the Bhabars in overcrowded sheds. The effects of such promiscuous living, among people of different localities, races, and traditions, are deplorable. The social control and settled hierarchy of the village community are entirely absent. The results are moral degradation and physical deterioration.

While the migration of whole families eliminates to a great extent the more serious drawbacks of promiscuous living, it has a very bad effect on the agriculture of the hills. The migration of only a few able-bodied men may encourage vice and immorality, but it does not lead to the deterioration of the standard of hill agriculture. On the whole, however, the former method is probably to be preferred, as it saves the community from moral degeneration.

The Bhabar exodus, when compared with the Bhotiya migrations, shows many sharp contrasts, but only a few points of similarity. The Bhotiyas migrate during both the summer and the winter, but the Bhabar migrants travel during the winter only. Transport is a very difficult problem for the Bhotiya. His goods are carried by goats, sheep, mules, and *jhur*, and wheeled traffic is unknown to him. The goods carried are bare necessities. But during the Bhabar march wheeled traffic is most commonly employed. Bullock-carts and motor-buses replace the goats and the sheep. Articles of luxury are as easily carried as goods of daily necessity. Amongst the Bhotiyas the women carry the goods in bell-shaped baskets slung over their backs, but in the Bhabar exodus the women use huge basin-shaped baskets, which

they carry on their heads. In a Bhotiya migration, apart from the carrier-flocks, very few cattle and other animals are seen, buffaloes being entirely absent. But in the Bhabar march the party is accompanied by great numbers of cattle, milch and dry, mostly buffaloes. The Bhotiyas invariably use the tent, but the hillmen travelling to the Bhabars never use it. The Bhotiya camps are situated in the non-shop area, and are determined by the available supply of water and the nearness of the grazing grounds. The Bhabar migrants, on the contrary, invariably camp near the roadside shops. The daily march of a Bhotiya is not more than 5 or 6 miles, but the Bhabar migrants never travel less than 10 miles, as the roads are easy. Among the Bhotiyas the men and women help equally in arranging the camp, but amongst the Bhabar emigrants the women alone do everything.

On the other hand, both types of migrations are similar in that they are due to the desire for a better climate and an easier livelihood. Both are periodical and temporary, and in both the families migrate after the observance of a little ceremony.

The reason of the contrasts is to be found in the geographical environment. The physical features amidst which a Bhotiya travels are such as could not be modified by him, and hence he adapts himself to them instead. His whole kit, his tent, his system of transport, his daily itinerary, and his selection of camping grounds are all adapted to the needs of the region, whereas in the sub-Himalayan region, where the conditions are not so difficult, man has subordinated the region to his needs. With the modification of the physical features the mode of travelling also changes, as is exemplified by the advent of motor traffic.

CHAPTER XIX

THE SOCIO-ECONOMIC STATUS OF THE WOMAN

(DIVISION OF LABOUR AMONG THE SEXES)

THE position of the woman in the Himalayas, like everything else, is materially affected by the natural environment. This fact is shown by a comparison of the respective positions of the woman in the two chief physical regions of the district viz the Bhotiya and the Almora regions.

Among the Bhotiyas, especially those of Darma, Byans, and Chaundas, the women occupy an important place. All the able-bodied males migrate during the summer months to Tibet, and during the winter to the submontane marts, leaving everything in charge of the women. During this period the women have to manage all the domestic affairs of the community, and sometimes tackle difficult problems and take important decisions on their own initiative. This training in responsibility makes them self-reliant and capable housewives.

The women are employed chiefly in weaving woollen blankets, and are assisted in this task by the men. They can dispose of their fabrics in any way they choose. They have no agricultural labours to attend to. The division of labour among the sexes is not inequitable. The men have reserved for themselves the more tedious and onerous tasks for example, the march to Tibet. Like their Tibetan sisters, the Byansi women play an active part in trade and business, even at such important fairs as Jouljibi, and unlike the Almora women they do not eat the leavings of the men. Men, women, and children sit and eat together, because the exigences of the march do not allow much leisure, and meals have to be got through as quickly as possible. In matters of dress, moreover, they are better cared for. The biting winds and the frost of their mountain home make woollen clothing an absolute necessity. Hence they always wear woollen garments, made of the fine wool imported from Tibet, and woven by

field-produce, threshing, etc Except during the sowing and harvesting seasons, they pass their days in comparative ease.

This unnatural division of labour, under which the field-work is done by the women, while the household affairs are relegated to the men, has given rise to many evils Polygamy,¹ which is generally practised by the lower class of the people, is the foremost of these A cultivator who possesses a large holding will usually be the husband of more than one wife He marries more wives in order to work more land Two wives are thought to be the first essential in the necessary equipment of a hill cultivator, and the hillman's wealth and prosperity may be measured by the number of his wives

The inferiority of the woman's position is reflected also in the system of marriage prevalent in the hills Wives are literally bought as chattels, and the hillman can buy as many as he likes They not only work for him, but also yield him children The daughters he sells on profitable terms, while the sons help him like their mothers

This state of affairs also explains the treatment received by the woman and legal status assigned to her In theory she is of course man's other self, or power incarnate (*Shakti*) On occasions of religious celebration, such as marriages and pilgrimages, she occupies a foremost place Polygamy is discouraged by the hillman's saws and proverbs² Every hill-top is honoured with a temple dedicated to a goddess for example, Dunagiri, Shiahidevi, or Bananidevi "Without a woman," the proverb says, "everything is in darkness" Again. "He who has not a wife has no body in the world"

In practice, however, things are entirely different A woman has been likened to a worn-out shoe, which can easily be replaced by another. Inside the house she must take her meals when all the men have finished In respect of clothing and ornaments she receives niggardly treatment She cannot dispose of the household goods as she wishes or when she requires She cannot sell or distribute grain in large quantities The men are the custodians of hard cash, and all monetary dealings are their exclusive concern During the harvest

¹ Polygamy probably arose from the difficulties, even greater in the past, of cultivating the stony mountain slopes, which necessitated a multiplicity of help-mates In the rural areas there is an excess of females over males

² Cf The local proverb "Two marriages make the life of a man as wretched as that of a dog"

her husband coaxes her into toiling her hardest, but at *other times she* is treated as live-stock. The husband chastises his wife, and the men often talk boastfully of the necessity of maintaining discipline in the house. The woman has no social rank whatsoever. Unlike the Bhotiya wife, she cannot sew, knit, or make or mend clothes. On account of her incessant labour and constant exposure to the weather, she becomes hard-featured even by middle-age. Her only enjoyments are playing on a *binai* (a small musical instrument) and singing *baira* and *bhagnolas* (ballads and rustic songs). Occasionally she goes to some fair in the neighbourhood. Her wealth consists of a few silver ornaments, the chief of which are bracelets, bangles, nose- and earrings, and a necklace (*hammal*) of British-Indian silver coins. She is the first member of the household to get up in the morning and last to go to bed at night.

The mortality, suicide, and desertion figures illustrate her hard lot. In the decade 1911-1921, the females had a higher death-rate than the males.¹

<i>Year</i>	<i>Males</i>	<i>Females</i>
1912	7,427	7,554
1915	8,659	9,596
1916	7,839	7,900
1917	7,148	7,231
1918	10,920	11,832
1919	9,971	10,401
1920	9,435	10,205
1921	12,089	12,583

The suicide and desertion figures are not available from the Census Report. At least 75 per cent of the suicides are among the women, who destroy themselves out of disgust with their hard lot.

The woman's legal disability is a corollary to her social inferiority. A daughter is not entitled to any share in her father's property. Her position is much weaker than under the ordinary Hindu law. An unrelated partner or a distant relative may succeed in preference to her. She cannot lay claim to any of the village offices. As regards

¹ The district contained 265,253 males and 265,085 females in 1921. In 1931 these respective figures were 292,004 and 291,298. Exclusive of urban the males numbered 286,852 and the females 287,735 in 1931.

"woman's property" (*stridhan*) the Mitakshara law is not followed. It devolves like other property.

The causes of this hard lot are to be found partly in the influence of the environment and partly in the peculiar stage of social development. The hillman's agriculture necessitates very hard and intensive labour, especially in the initial stages of terracing. It is probable that the hillman, when agriculture was first introduced, himself engaged in the more onerous tasks, like the clearing of the fields and the building of the terrace walls. While he was thus employed his wife and children assisted him in preparing the soil and sowing the crops. Later on this division of labour became stereotyped, even when the work of terracing and cleaning the fields no longer taxed his strength. At a later stage the man, instead of helping his wife in the details of cultivation, became indolent because generations ago he had finished his part of the job!

The transition from the pastoral to the agricultural stage also seems to account for the low status of the woman. In the pastoral stage the woman was bought like an animal. When the hillman became an agriculturist the old practice was retained on account of its convenience. Owing to its exceptionally difficult nature, the cultivation of the mountain slopes called for many helping hands, and the pastoral custom of purchasing brides enabled the hillman to procure as many extra hands as he could afford to keep. As he had paid for them like other beasts of burden, he tried to get as much work as possible out of them. And once the system which enabled one section of society to live on the labours of another was introduced, it could not be given up in the absence of rebellion on the part of the oppressed. This rebellion has been lacking so far, but discontent is daily increasing and a change may occur any time. On this change depends the future welfare of the Himalayans, for it is the status of the woman that largely determines the mental and moral progress of a people.



COMPLETELY TERRACED RIDGE



BYANSI FEMALIS TAKE AN ACTIVE PART IN TRADE AND BUSINESS

A scene from the fair at Jouljiba

CHAPTER XX

MARKETING IN THE HIMALAYAS

FAIRS AND MARTS

MARKETING in the hills is a very difficult problem. The rugged and inaccessible nature of the country, shut in by high mountains and cut up by deep watercourses, makes communication very difficult. Daily marketing under such circumstances is almost impossible, and hence the need is felt for periodical commercial gatherings at convenient centres, where the exchange and sale of commodities may be effected. This need has given rise to the holding of annual and periodical fairs throughout the district. Men and women from distant parts, with all sorts of commodities, come together on certain especially sacred days that have been fixed to commemorate important episodes in the lives of deities or saints. The gathering may continue for a few hours or a few days, and when all the necessary transactions have been effected the place lies empty for the rest of the year. As the population increases, and the economic life becomes more varied, these fairs become more numerous and frequent. The business, formerly confined to a few principal annual fairs, is now distributed over many smaller and more frequent markets. The principal fairs are thus losing their importance.

The population of the district is fast increasing. Between 1872 and 1921 it gained no less than 53·81 per cent in population, this being the second largest increase among all the districts of the United Provinces (Gorakhpore 63·2). Improvements in the means of communication are also being effected. Consequently both the factors referred to above are at work in transforming the fairs of the district.

These fairs or periodical marts are of two kinds. The weekly or semi-weekly assemblies, corresponding to the market days in an English provincial town, are known as *penth*. They are mostly confined to the principal towns in the Bhabars. In a wide, level, open place the vendors display a great variety of commodities, either in baskets or in orderly piles. It should be noted that here the women

¹ Between 1921 and 1931 there was a further increase of 10 per cent in population.

act as vendors side by side with men. Folk of the same trade sit together, and erect crude and temporary calico shelters to protect themselves from the heat of the sun. These assemblies have no religious significance, nor do they provide any of the lighter attractions. But everybody expects to see everybody else at the market. They are more important during the winter months, when the migrations from the hills have taken place.

The most numerous of these periodical marts are the annual fairs or *melas*. Apart from their commercial importance, they have a religious and traditional aspect, and are not without their lighter side. There are several of these fairs at different times of the year. Scarcely a month passes without a fair in one or another of the eleven subdivisions (*parganas*) of the district. But they are more frequent during the winter, when the people are comparatively free from field-work. This is apparent from the following table.

Winter		Summer	
Month	Number of Fairs	Month	Number of Fairs
October	17	April	4
November	7	May	8
January	3	June	2
February	10	July	11
Total	37	Total	25

The more important fairs are held during the winter. The fairs are distributed throughout the district, and the prosperity and commerce of a *pargana* can usually be gauged by the number of fairs held in it.

Nearly one hundred fairs, the attendance at which varies from 1,000 to 20,000 persons, are held annually in the district. Their distribution according to *parganas* is shown in the table opposite.

These fairs generally centre round some local shrine, which earns a large income at the annual festival. The business side of the fair consists of buying and selling different articles of food and clothing.

and other necessary requirements and luxuries of everyday life A great deal of trade is effected by barter

The religious ritual of the fair consists of a dip in the river, if the fair is held on the banks of a river, or the worship of the presiding deity, if it centres round a shrine

The rest of the day, after business and religion have received due attention, is spent in merry-making All the visitors to the fair—men, women, and children—are seen in their holiday apparel and

Baramandal	22	Gangoli	10
Danpur	14	Kali-Kumaon	16
Shor	3	Askot	1
Sira	3	Pali Pachaun	25

Of the remaining three *parganas*, Johar and Darma are unimportant, being frozen during the winters, and Phaldakot forms part of the Pali

their merriest mood Every hue and variety of costume is found in the fair People sing rustic songs and dance to the accompaniment of a drum (*hurka*) Throughout the day the whole locality buzzes with noise and chatter Shopping goes on briskly, and most of the villagers are to be seen buying and eating sweets, which are rare in the villages Sometimes they will hang like a swarm of bees round a few of the shops, admiring and buying the trashy foreign-made wares It is no easy matter to saunter along the streets, for the crowd is continuously surging backwards and forwards Pushing, in fact, is regarded as one of the best forms of amusement at the fair Some of the visitors give themselves up to drinking and gambling The gamblers regard the fairs as their high courts of appeal They come in their hundreds, and thousands of rupees are lost

In order that every cultivator may attend these annual commercial gatherings, the dates of the important fairs are proclaimed as public holidays These holidays are further enforced by religious sanctions On such days ploughing and other field-work is strictly prohibited, indeed, the fair days are known as *ajota* or non-ploughing days

The most important fairs of the district are described below

hwar lies 27 miles north of Almora, at an elevation

of 3,143 feet The annual fair is held here at the confluence of the rivers Sarju and Gumti on *Makar Shankranti* day, which falls roughly in the middle of January Some 20,000 people, consisting mainly of Bhotiyas and Kumaonis, assemble here Every *pargana* is well represented at this fair, as Bageshwar is connected with all parts of the district by very good roads, running south to Almora and Binsar, north-west to Baijnath and Garhwal, north to Pindari Glacier and the Johar valley, and east through Thal to Darma It is important alike for the traders from the north and the customers from the south

The fair begins one day before *Shankranti* (the first day of the solar month), and lasts for four or five days All kinds of domestic animals, implements, articles of clothing, and indeed everything that is produced in the country, are displayed for sale

Traders flock hither in large numbers to act as middlemen or purchasers All the Bhotiyas, and especially those of the Johar valley, attend the fair, wool and woollen goods such as blankets, shawls, and carpets forming their chief merchandise They also sell Bhotiya ponies and goats and sheep The ponies breed on the high grassy slopes in a semi-wild state, and are greatly in demand as saddle-ponies for use in the less open parts of the district The goats and sheep are bought by the hillmen for meat, which is a necessity in these parts during the cold season In addition to these, the Bhotiyas bring also yak-tails for use as fly-whisks, various kinds of skins and furs,¹ musk-pods, claws and horns, medicinal herbs and roots from Tibet, beeswax, bear's gall, wooden bowls, borax, and leather or skin bags of various shapes and sizes Many Tibetan and Chinese curios, and rarities like Chinese bowls and Tibetan tables, are also to be found

Next to the Bhotiyas, the most important group is that of the people of Danpur, who deal in *ringal* mats, boxes, and baskets of innumerable sizes The makers of leather, iron, and copper vessels and the potters also exhibit their wares

The Almora traders send their representatives with cotton goods, umbrellas, iron, brass, and copper utensils, grain, oil, salt, tea, sugar,

¹ Skins and furs of the following animals are offered for sale Goat, sheep, leopard, tiger, deer, muskrat, fox, white fox, beaver, mink, marten, silver fox, cross fox, red fox, otter, lynx, etc

sugar-candy, *gur* (molasses), and treacle cakes. Among the foreign wares, some of a cheap and flimsy character that find a ready sale, may be mentioned soaps, looking-glasses, studs, and buttons, safety-pins, socks, toy watches, belts, handkerchiefs, whistles, locks, playing-cards, china ware, and rubber toys, fancy tin boxes, aluminium utensils, electric torches, and imitation jewellery. Every man, woman, or child who comes to the fair with a load of fuel buys some of these knick-knacks as souvenirs, and goes back to the village exhibiting them throughout the journey.

The neighbouring villages bring such provisions as milk, curds, *ghi*, and sugar-cane, and fruits such as oranges, plantains, and walnuts.

Apart from the permanent bazaar and booths, many goods are exhibited in special areas assigned to the different trade groups. The Bhotiyas come with their tents, which serve them as dwellings as well as shops. The Danpur people live in the open, amidst their mats and baskets. Some of the traders build temporary shelters. The temporary markets consist of long lines of booths bordering the principal roads. A cosmopolitan stream of people flows up and down each roadway, and transactions worth three lacs of rupees take place. The fair is the largest in the district, and indeed in the division.

The religious ritual of the fair (*mela*) consists in bathing before daybreak at the confluence (*sangam*)—the holy of holies—where the two rivers meet.¹ After bathing, an offering of water to the God Shiva² in the Bagnath temple is essential. Those who are more religiously disposed continue this practice of bathing and offering water for three days in succession. This is known as *Trimaghi*, or the observances performed during the first three days of the month *Magh* (January–February). Among the men, some shave their heads and offer rice balls to their departed ancestors.

¹ Bageshwar, among the Hindus, is known as "the Benares of the north," and a bath at the confluence of the Sarju and the Gumti is considered to be as purifying as a bath at Allahabad—the confluence of the holy Ganges and the Jumna.

² According to the Hindu mythology, Shiva, Mahadev, or the Lord of the Mountains, is one of the gods of the Hindu Trinity. He is a very stern god, and the destroyer of all evil. He bears the new moon on his forehead, and wears the venomous cobra as his necklace. In his hands he holds a trident (*Trisul*) and a drum (*Damaru*). The river Ganges flows from the heavens into the world below through the clusters of his hair (*Jata*). His wife, Parvati, is the daughter of the Himalayas, and his son, the elephant-headed Ganesh, is the giver of all success. Throughout India he is worshipped in every Hindu house, and in the numerous public temples.

The lighter side of the fair is to be seen round the innumerable camp-fires¹ lit throughout the surrounding area, where the people encamp according to their villages. The ridge presents an impressive spectacle at night, when all the camp-fires are distinctly visible. Round every important camp-fire, and under the starlit sky, the villagers sing, dance, and gossip all night long. They have their love-songs, duets, and folk-dances, the most common of which is the ring-dance of the Danpur people, known as *chanchari*.

During the daytime the villagers march in procession along the main thoroughfares, beating drums of all sizes and tones, blowing shrill trumpets, rattling rusty swords, and waving their banners (*nishan*). They move at a snail's pace, and spend the whole day in sight-seeing, singing, dancing, and general merry-making. Some of them will sail round and round in a "roundabout" contraption (*charkha*). Of recent years the national folk-dances and village processions are being superseded by the gramophone, the bagpipe, and magic lantern shows.

Formerly agricultural exhibitions and pony races and other sports were held under official auspices, but with the decline in the prosperity of the fair, consequent upon the increase of population and improvements in the means of communication, they have been discontinued. The fair has lost a good deal of its popularity since the itinerant trader has penetrated the villages and the motor traffic has made the weekly markets in the Bhabars more accessible. New fairs, like that of Jouljibi, have also sprung up and diverted a large amount of trade to themselves.

Jouljibi is situated some 6 miles north of Askot on the Nepal frontier, and on the confluence of the two rushing rivers, the Kali and the Gori. Beyond the Kali the land belongs to the State of Nepal, and on the British side to the Rajbar of Askot. The fair is held on the first day of the ninth Hindu month (*Margshir*), roughly corresponding with the middle of November. It is a fair of quite recent origin, the first fair at Jouljibi having been held in 1914. It has made tremendous progress since

¹ Throughout the day of the fair and the day preceding it the people may be seen pouring in with their families, dressed in their best, but dragging branches and logs of trees for these camp-fires. Fuel at Bageshwar is very scarce and costly.

Like Bageshwar, Jouljibi lies at the junction of four important routes, viz., those leading from Nepal, Askot, Johar, and Darma respectively. Hence, among the people assembled, Bhotiyas from *parganas* Darma and Johar, Tibetans from Taklakot, and Nepalese from Doti predominate. The Almora traders flock thither with their merchandise, and also the neighbouring people from Shor, Sira, and Askot, who supply the provisions. As in the weekly markets, here also there is a definite allotment of space for each different trade.

Ponies from Tibet, Bhot, and Jumla form the chief merchandise. During the daytime they are left to graze on the adjoining mountain slopes, but at night they are tethered in front of the Bhotiya tents. The space becomes so overcrowded that it is often difficult to pick one's way through.

Next to the ponies, woollen goods from Tibet and Bhot are the most important merchandise. These can be had here in their most genuine form, as Jouljibi is the first mart visited by the Bhotiyas when they migrate southwards from Tibet. The goods, besides being genuine, are also cheaper here, as the supply is comparatively large and the buyers few, and owing to the nearness of the Bhotiya villages there is a saving in freight. Examples of genuine Chinese rugs, now so rare, may be seen here. Every rich Bhotiya keeps a few such rugs for his own use. They are exquisite in appearance, and are to be bought from the Bhotiyas only by the offer of an exorbitant price.

The Nepalese trade in *ghu*, grains, and fruits is also very important. The Bhotiyas of *pargana* Darma deal chiefly with the Nepalese (*Kalipariyas*). Trade by barter is most usual among these groups. The Darma Bhotiyas also make good profits by selling fuel and grass.

The celebration of the fair coincides with the opening of the pass and the bridge to Nepal. During the rains the river Kali sweeps away its bridge, and becomes very formidable. But during November a temporary bridge, which lasts until July, is constructed by some of the villagers from Doti (Nepal), who are exempted from the import and export duties levied by the Nepal Government.

Apart from some two dozen permanent structures, temporary kiosks and tents predominate. To the dirty tents of the Bhotiya are added the still more dirty and nondescript tents of the Khambas from Tibet. Some 15,000 people assemble here, and goods worth about

two lacs of rupees are exchanged. From the commercial point of view it has become nearly as important as Bageshwar.

Jouljibi, unlike Bageshwar, does not possess any religious significance. Bageshwar's greatness is due to its age-long tradition as being a place of pilgrimage. But attempts are not lacking to give some religious significance to Jouljibi as well. A temple has already been constructed on the junction of the rivers, and people are gradually beginning to bathe at the confluence.

The merry-making of the fair is more interesting and varied than at Bageshwar. The ring dance or *chanchari* of Danpur is absent, but its place is taken by the ring dance of the Nepalese and the Bhotiyas, where men and women revolve clockwise to the rhythm of the music. The *hurka* of Bageshwar is less common, and there are fewer camp-fires at night. The fair by day is more picturesque and shows wider contrasts in the customs and costumes of the people than the Bageshwar fair.

In the interval between this fair and that at Bageshwar the Bhotiyas make a few journeys to the Bhabar marts, when they sell a considerable quantity of their goods. Raw wool is sold, and cereals, *gur*, and salt are purchased at Ramnagar, Haldwani, or Tanakpore. By the beginning of January, when the great fair at Bageshwar is held, the Bhotiyas, having completed their first trip to the submontane marts, return to Bageshwar. After attending the fair the second trip to the Bhabars is undertaken, and is completed some time in April,¹ when preparations for the march to Tibet begin.

In order to facilitate these preparations the third and the last fair of the Bhotiya series is held at Thal on the eastern bank of the eastern Ramganga, in the middle of April. It lasts for a week. All the Bhotiyas of the three passes must journey through this place, as it is the meeting-place of the four important routes from Pithoragarh, Bageshwar, Askot, and Tejam respectively. Here during the full week of the fair, a sort of "clearance sale" takes place. The Bhotiyas try to sell all their unsold goods from the Bhabars at any price they can get, and the season's accounts between the hillmen and the Bhotiyas are now

¹ While these trips to the Bhabars are being made, the Bhotiya women are engaged in manufacturing such blankets, etc., as can be woven out of the inferior and nearly exhausted stocks of wool.



THE PEOPLE, AFTER BATHING, ARE GOING TO WORSHIP IN THE
TEMPLE



THE SCENE AT THE TEMPLE
Which is situated below the tree

settled. The Bhotiyas then lay in their final stocks of rice, wheat, *ghr*, and other produce for their journey back to the summer habitations. The revenues and other dues levied by the Government are also paid at this fair. Some 12,000 persons assemble here annually. The goods sold here are both inferior to and cheaper than those sold at Jouljibi and Bageshwar.

In the western and southern parts of the district the fairs differ slightly from those described above. In them there is a good deal of merry-making, but little business is done. Among the sports and recreations, the sham warfare waged by the hurling of stones is characteristic. Two teams are made up, and some object is set up as the target, the capture or hitting of which determines the victory. The teams then pelt one another with stones, and the party which succeeds in capturing the object wins the laurels. The fairs of Devidhura, Vykiasen, Sialde, and Somnath are the best examples of this type.

CHAPTER XXI

TRANSPORT IN THE HIMALAYAS

THE means of transport in the trans-Himalayan or Bhotiya region differ greatly from those prevailing in the sub-Himalayan or Almora region. In the Bhotiya region the inaccessibility of the rugged mountain-sides, the asperities of the snow-clad ranges, broken here and there into mighty precipices and deep canyons, the high passes, swept by blinding snow-storms, and the desolate snow-banks and glaciers, whose treacherous surfaces are full of deep crevasses, make the existence of even narrow footpaths impossible. To a traveller going up from the plains—with their metalled roads, motor-cars and lorries, railways and tramcars—the contrast is very great. He finds himself all of a sudden in a remote country where goats and yaks are the principal means of transport, and where the majority of the people have never even heard of the modern means of transport.

Wheeled traffic is unknown in this region, and the only roads (if roads they may be called) are the narrow trails of the roughest and most dangerous character, with precipitous ascents and descents. They are very few in number, and are often maintained along or just above the river bank: e.g. the road between Munsiri and Milam. They are seldom direct, and often zigzag along the face of the mountain.¹

Most of these rudimentary and primitive trails or goat-tracks are swept away by the autumnal rains and snows, when slips and clefts occur in the mountains. These slips are sometimes so overwhelming that not a scrap of soil is left on which to make a new track. They change the physical map of the country beyond recognition, as was seen in the action of the Gauna and Sobla slips in the last century. Apart from these natural accidents, the paths are deep under snow during the winter months.

The number of the mountain streams, and the rapidity of their flow, offer further impediments to traffic, more especially during

¹ So impassable are these tracks that a Bhotiya proverb says that on such a path ten goatherds are needed to drive nine goats.

the rainy season. Their dangerous and uncertain character make it impossible to construct bridges over all of them, so that only the most important have been bridged.

In the earlier part of the season, immediately after the winter, natural bridges of snow, formed of the accumulation of avalanches, abound in the valleys of the Kali and the Gori. But there are also artificial structures which are ordinarily thrown across the river where its bed is narrowest, and therefore its current swiftest. Four types of bridge are commonly met with in these parts. Their technical details vary but slightly, according to the breadth of the stream.

The first type of bridge consists of a single spar thrown across the stream from bank to bank. The second is a little more elaborate, and looks like a ladder thrown across the stream. Successive layers of timber, laid from either bank, gradually project like an arch, and reduce the interval to such an extent as to admit a single plank. This is usually 2 or 3 feet in width. This type of bridge is known as *sanga*. It bears some resemblance to the cantilever bridge of modern times.

The third variety of bridge is known as the *jhula* or swinging bridge, which is built across the wider streams. Two parallel rope cables are stretched across the stream, and from these is suspended a ladder-like roadway, consisting of small flat pieces of wood, lashed a full step apart. The two cables form a sort of balustrade, and the lengths of rope (nearly a yard in length) which tie the small planks (from 1 to 2 feet in length) act as palings. When goats and sheep are led across the interstices of the rungs are closed with a layer of branches. In order that the cables may not break under the strain, travellers cross the *jhula* bridge one by one.

In some places, as at Dharchula, even the *jhula* is absent, and the two banks of the river Kali are connected merely by a single cable slung across the stream and anchored securely to two strong stakes, one on either bank. The Bhotiya secures himself with a noose, so that he may not fall into the raging torrent. After thus securing himself, he crosses the river monkey fashion with the help of his hands and feet. His life literally hangs by a thread. Sometimes a basket, a stool, or a cradle is similarly suspended from the cable, and the passenger or the load of goods is placed in the basket.¹ This is either pulled

¹ Cf. the electric ropeway

across by a man on the opposite side of the stream by means of a line attached to the basket or cradle, or the person crossing himself pulls it over to the opposite bank. This requires both courage and strength. This device is known as *chinka*.

Animals accustomed to the lower altitudes and the easier roads of the plains find the rarefied air and the rough tracks of the mountain region both trying and dangerous. They can ill endure the rigour of the climate and the fatigues of the journey, for which reason the bulky beasts of burden like the buffalo, the ox, and the elephant have given way to the lighter and more sure-footed animals like the sheep, the goat, or the Bhotiya pony. The ordinary cattle of the sub-Himalayan region are no longer met with, and their place is taken by the yak, the *jibu*, and the goat.

Man, too, must needs become hardy and brave in these regions. Owing to the paucity of the means of communication, he himself has to act as a beast of burden to a larger extent than elsewhere. He has so far adapted himself to his environment that he can climb these tracks as nimbly as his goat.

Of the chief means of transport, man occupies the first place. Although the amount of goods carried annually by human bearers is not very great, yet he alone can pass where even the dumb animals are afraid to go. It is he who, by much coaxing of his unwilling beasts, manages to get them across. He exerts great strength and exhibits marvellous endurance in carrying loads up the steep hill tracks and across treacherous scree. He perspires less than a pony during a climb and is wonderfully sure-footed. He is indispensable in these heights.¹ Merely walking or climbing over steep trails at heights of 12,000 to 16,000 feet is difficult enough, but to climb them with loads of

¹ That he is indispensable is testified by such eminent climbers as General Bruce, Mallory, and Danielli. General Bruce says "The porters gave us a first-class exhibition of load-carrying. They were absolute gluttons for work, I never could have believed that men could have carried out such tremendous hard labour in establishing our high camps" (*The Assault on Mount Everest*, p. 95).

The late Mr. Mallory adds "We had confidence in our porters. Surely these men were fit for anything. They had come to share in our enterprise" (*ibid.*, p. 182).

Professor Giotto Danielli observes "The excellent caravan porter can go to any height, which Europeans can reach only with difficulty."

Mr. F. S. Smythe writes "Without whom the expedition would have been impossible" (*The Kangchenjunga Adventure*, p. 440).

40 to 60 seers (80 to 120 lb) is a marvellous feat, and one which can be performed only by these "toilers of the snows"

Every able-bodied man among the Bhotiyas and the Dotiyals is a caravan porter, and is ready to go to any height with heavy loads. He differs radically from his confrère in the Indian Railway stations. His sole covering is a homespun blanket, neatly folded round and across the body, and fastened by two great iron or copper pins. He has a bell-shaped basket of *ringal*, usually 2 or 3 feet in height, known as *kilta*, *doka*, or *ghura*. It is usually circular in design, but occasionally it has a rectangular base. The load is packed in the basket, which is carried over the back, supported by means of two slings or shoulder yokes (*kanyala*) attached to the basket, through which the arms are passed. Sometimes, when the load is a box or a steel trunk, or when the basket is very heavy, it is supported by a band passing across the forehead. In the case of a heavy load the head-band helps to keep the slings in their proper place, and prevents them from causing pain in the armpits. In many cases the basket is covered with a net, which keeps the load together and prevents it from falling out in transit. Every porter carries a T-shaped stick (*matta*). After trotting a short distance he sets this T-shaped stick behind him, rests his load on it for a few moments, and then walks on again. His early training has given him practice in carrying heavy loads. An average porter will carry up to 30 seers (60 lb)² in the very difficult country above 12,000 feet, making from 10 to 15 miles a day. But over the ordinary hill country below 12,000 feet his carrying capacity is far greater. Here he may even be seen carrying a man or woman weighing more than 2 maunds (160 lb) on the top of his basket.³ The maximum weight which a very strongly built porter can carry is between 3 and 4 maunds. He is also capable of enduring great fatigue, and will travel the whole day without food, arriving at his destination in quite a cheerful mood. He never loses heart in the face of difficulties which would unnerve the ordinary

¹ Women also act as porters and use the baskets and the T-sticks, but they seldom act as hired porters.

² During the post-war Himalayan expeditions, they carried 60 to 80 lb per man and were frequently on short rations.

³ A sort of a ladder-like attachment is provided, and a few small strong sticks are passed through the middle of the basket, forming a rough chair-like seat for the human load.

man It is a marvel to see these "toilers of the snows" carrying such heavy burdens so cheerfully over such difficult and hazardous tracks, where an unburdened man from the plains is unable even to walk steadily

He has very strange notions of comfort When he finds that his load is too heavy, and is oppressing him too much, the first thing he does for relief is, strangely enough, to increase his load by a heavy stone or two from the side of the track ¹ He struggles on for some distance under the increased burden, casts off the heavy stones which he added a few minutes earlier—and he no longer feels that the load is excessive ¹ He acts in an equally perverse fashion to meet the biting cold of the cold season His clothing consists of a single rough home-spun blanket, which serves also as his bedding and his waterproof, irrespective of changes of climate and temperature During the winter, when it snows heavily, he feels the necessity of more clothing, but his slender means do not allow of any addition Hence he seeks relief in an expedient which costs him nothing, but which hardly seems satisfactory When he finds the cold unbearable the first thing he does to warm himself is to take off his blanket for a few minutes, and expose himself to the cold, and then wrap himself in it again.

Inside the bell-shaped basket, in addition to his load, he carries a very light basin-like iron pan known as *tasla* This he uses for more than one purpose, he prepares all his meals in it, whether these consist of meat, curry, rice, bread, or vegetables It not only serves the purpose of a frying-pan, but is also a kettle, a cup, and a dish all combined in one The flour is kneaded and the rice is washed in it It is also used to fetch water from the spring and fuel from the jungle And at night it becomes a pillow

Every caravan porter among the Bhotiyas is trained also as a muleteer As such he is not encumbered with a load, but his task is more hazardous and responsible than that of a mere porter Day after day he must load and unload the caravan of ponies, mules, and *jibus* The loads have to be apportioned equally on both sides of the pack-animals, and he must lift every load in order to test the balance Every now and again he has to resort to a good deal of coaxing in

¹ "One grief drives out another" If you sit on a pin, you may forget that you have toothache.

order to get the kicking and braying animals across the numerous streams and the difficult sections of the tracks. Sometimes a loaded mule or pony slips down the hill-side, and if by good fortune it is not killed, he has to improvise a track by which it can regain the path. In some cases, where the beast is incapacitated, he has to crawl back to the path carrying the load (weighing two maunds or more) himself.

Among the animals adapted to human requirements in these regions, the sheep are the smallest and most delicate. These little animals bear most of the burden, and are the cheapest carriers in pathless Tibet. Like that of the woman in the sub-Himalayan region, their lot is very hard and pitiable. As long as they are able to carry a load they serve as beasts of burden, but so soon as they are disabled or past their work they are killed and eaten.

All dry commodities, and such articles as grain, salt, and wool, which can be made up into small equal loads, are carried chiefly by sheep. Both the Tibetan and the Kumaon breeds are used. The Kumaon-bred sheep are generally purchased from Danpur. They cost between Rs 3 and Rs 5, and will carry 10 to 12 seers of load. The Tibetan sheep are more active and stronger than the Kumaon breed. They carry from 15 to 20 seers, but are unable to bear the heat of the lower Himalayan tracts. They are used only on the tracks connecting the mountain villages and Tibet. The laden sheep usually make 5 miles a day, the average speed being 1 to 1½ miles per hour. They travel for four or five hours in the morning, and are unloaded and allowed to graze on the wayside pastures¹ during the heat of the day. They usually travel in a long crowded group behind the goats.

Goats—both those bred in Kumaon as well as those imported from Tibet—are likewise used as beasts of burden. The Kumaon-bred goats are long-haired and sturdy, and are usually imported from the western Himalayas. They carry a slightly heavier load than the sheep, the average being 12 to 15 seers. They cost between Rs 4 and Rs 8 each, and are chosen for their superior activity and strength. They lead the long processions, and are furnished with iron bells, which give out a resonant note with every movement. During the

¹ They need no special fodder and are able to live on the scanty shrubs and sparse pasturage of the rocky valleys.

early hours of the morning the tinkling of these bells breaks the monotony of the bleak and rugged mountain path, and tells the drovers the whereabouts of the herd. So highly trained are some of these leader-goats that they seem to understand and obey the peculiar whistles of the shepherds and their shouted commands of "Gee" and "Shsh." Like the sheep, they travel only some 5 miles a day.

The manner in which the goods are carried by these little beasts is peculiar. The grain or salt is sewn up in homespun saddle-bags, known as *karboza*. Each saddle-bag, as we have seen, consists of two pockets, which are partly lined with leather, both inside and outside, in order to protect the contents from moisture while travelling, or when the bags are piled on the ground in the camp. The bag is slung across the animal's back like a saddle, and is firmly secured by a crupper under the tail and a girth round the chest. On loading and unloading, the neck of the animal is first secured between the drover's legs, and then the loads are fastened or untied. The orderly manner in which these little creatures carry their saddle-bags, especially where the track is at its narrowest, or where it crosses some ladder-like bridge, is altogether an impressive sight.

Their number is evidence of their utility and importance. The latest live-stock census (1912) shows that the district contains 119,576 sheep and 153,408 goats.

Every procession or flock of goats and sheep is accompanied by one or two Bhotiya dogs, who guard it against the attacks of wild animals. The Bhotiya dog has a shaggy coat, and a rough and rugged appearance. So zealous a guardian of the flocks is he that he will even kill a leopard, and so ferociously does he bark that no ill-disposed person will venture to go near him. In the temporary absence of the drover he drives the flocks, and occasionally carries a saddle-bag. His courage and skill are as remarkable as those of the shepherd.

The Bhotiya ponies are rather small and clumsy animals, and with their wiry and shaggy coats are wild and rough in appearance. But in spite of their size and looks, they are very docile, sagacious, active, swift, and remarkably sure-footed. Their power of endurance is also marvellous. All these qualities have made them especially suitable for riding through the deep and snowy mountain passes during the hazardous journey to Tibet. They can carry a weight up to two and a half maunds.



THE ACTION OF AN AVMANCHI
A heavy landslide

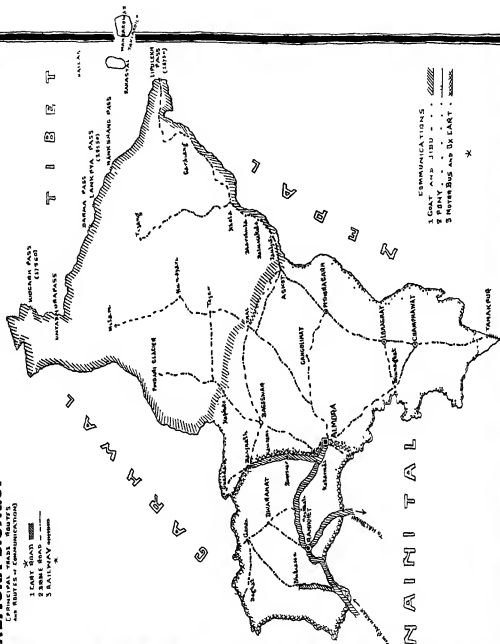


A LADDER-LIKE BRIDGE OVER THE KALI

ALMORA DISTRICT

(COMMERCIAL TRAILS, ROUTES
AND ROUTES OF COMMUNICATIONS)

- 1 EAST WEST
- 2 NORTH SOUTH
- 3 ROAD
- 4 RAILWAY



They are often imported from Tibet, and are esteemed too highly to be loaded with a pack. They are ridden unshod. Each pony has a special saddle, made to measure, which rises to a considerable height from the back of the pony, while the rider's feet rest in stirrups with very short leathers, so that the legs may be well wrapped up and protected from the high winds. In addition to the saddle, there are loading girths and saddle-bags. Every pony is equipped with a string of bells, the jingling of which, during the hours of early morning, furnishes a very good music, and indicates the whereabouts of the rider to the party following. The leader is adorned also with a red fringe hanging over its forehead. They are the fastest animals among all the carriers of this region. Their price ranges from Rs 150 to Rs 400. Unlike the goats and sheep, they require stall-feeding.

Like their muleteers, the mules are hardy and brave, and carry their loads of more than two maunds with comparative ease. Their average price is about Rs 200, but very good specimens will fetch from Rs 300 to Rs 400. Articles of merchandise like piece goods, iron or copper wares, or woollen stuffs, which are not seriously damaged by the wear and tear of transit, are carried by mules. They are owned by the richer Bhotiyas, whose goods they carry as far as Gartok in Tibet, or Ramnagar in the Bhabars. A very rich Bhotiya will occasionally own as many as eight or ten mules, but the usual number is between three and six, as larger numbers become difficult to manage. They need very expensive pack-saddles, and also they have to be fed during the night. Unlike the sheep and goats, they do not provide meat or wool. In ascending slippery tracks they often meet with accidents, and are sometimes swept away by the cold, surging waters of the Gori and the Kali. They are usually purchased at Gartok in Tibet.

Asses are regarded as an undignified means of transport by the Bhotiyas, and are owned either by the Tibetan Khambas or the low-class Bhotiyas. Among the Khambas they serve the same purpose as the mules, and carry loads twice their own size. They are as hardy and sure-footed as the mules, but are cheaper to buy and feed. Their price is from Rs 25 to Rs 50. They are imported either from Tibet or from Ramnagar.

For higher altitudes, north of the culminating ranges of the

Himalayas, no beast of burden is so important as the *kya* (*chawargat*) and the hybrids between it and the hill cattle

The wild yaks, which are found in the roughest and stoniest valleys of Tibet, at altitudes between 10,000 and 20,000 feet, are captured and trained as beasts of burden. Like the llamas of Peru, they are astonishingly sure-footed, even on the narrowest trails. Their hoofs are as large as those of the camel, and are wonderfully adapted to obtaining a secure foothold on the glaciers and rocks. They are shaggier than the Bhotiya pony, and have a tail like that of a horse, which hangs down like a festoon. Their tongues are peculiar, being armed with hook-like protuberances which enable the animals to dig through the snow and pull up the tough grasses lying buried beneath it. A tame yak costs from Rs 35 to Rs 50 and is able to carry two to three maunds. It is used also for riding. It is rarely docile and tractable, and its nose has to be pierced for a nose ring or cord.

Among the yak hybrids the cross between a pure yak bull and a hill cow, known as the *jibu*, is the most common and useful. The *jibus* breed freely,¹ and reproduce all the good qualities of both parents. They carry as much as three hill porters, and can walk from 3 to 3½ miles per hour. An ordinary *jibu* costs from Rs 30 to Rs 60. They are very agile and hardy, and able to resist both cold and heat much better than the yak. Like the llama, they are useful both on the cold open plateaux as well as in the dry, hot valleys. They can leap down from a height of 6 to 8 feet, even when loaded, and alight without any injury. They delight in climbing ice-encrusted rocks and glaciers. The denser air of the lowlands does not harm them, and during the winter they travel as far as Ramnagar without appreciable injury. Unlike the yak, they are both docile and sensible, and their noses are very seldom pierced. What is impossible to mules is only difficult to *jibus*. The Johari Bhotiyas use them in preference to either yaks or mules. They serve equally well as pack-animals and as mounts.

Besides the *jibu*, there are also some other varieties of hybrids. When the sire is a hill bull and the dam a female yak the cross is known as *garjo*. But when the dam is a *jibu* cow and the sire a pure

¹ In all the Himalayan valleys these hybrids are reared extensively, especially in Chamba and Rampur (in the Punjab).

yak, the progeny is known as *dimyo*; while the cross between a hill bull and a *jibu* cow is known as *jwam*. The male *jibu* is impotent. All these hybrids are used as beasts of burden, but none of them is as useful and as hardy as the *jibu*. There is a greater infant mortality among these other hybrids than among the *jibus*.¹ But all these hybrids, though slow-moving, are extremely useful, as they can be driven to places quite inaccessible to modern means of transport.

The narrow, dangerous, and difficult tracks of the Himalayas have their peculiar traffic regulations. If any goat or mule is pushed over accidentally by man or beast, the owner of the fallen beast can claim compensation, either in cash or kind, from the man or the owner of the beast that was the cause of the accident. In order to avoid such accidents during the busy season, the laden flocks going up to the highest habitations start in the early morning, but the returning and unburdened beasts begin their journey about 9 a.m., when the laden flocks have encamped.

In the sub-Himalayan or Almora region the conditions of transport are somewhat better, as the physical features do not offer such insurmountable barriers as those of the Bhotiya region. It is comparatively well supplied with bridle-paths, with an average width of 10 feet.² The best bridle-paths are carefully graded, and drained during the rainy season. But in some places the grades are too steep, and there are very sharp hairpin curves,³ as between Almora and Pithoragarh. These very quickly exhaust the traveller.

Again, during the rainy season the innumerable tiny rivulets and dry ravines become surging torrents, and to cross them becomes a serious problem. The crude single-plank bridges are swept away by the first rains, and men and goods are carried across by the professional swimmers (*ghat-men*), who cross them with the help of inflated goat skins or hollow gourds. The *ghat-men* first cross the stream with the load, and deposit it on the other bank, and then return for the passenger, whom they carry across dry on their backs. Sometimes, when the stream is too full and the current very swift, as many as twenty-five to thirty people will combine and form a

¹ The cross between a yak and a buffalo, known as *yakalo* in Canada, is unknown in this region.

² All the village paths can also be used as bridle-paths.

³ **W** and **Z** bends, as they are called by the road engineers.

chain by joining hands, and then wade through the water at an angle of 45 degrees. The swift and heavy current is unable to break this long human chain, and all are able to cross in safety.

In addition to the bridle-paths, all the important trade depots of the district are connected with one another by metalled roads. The towns of Almora and Ranikhet are connected up with the railway system by a regular motor service. Besides the road maintained by the Public Works Department, the District Board and the Forest Department have opened up serviceable paths and roads. The main motor road, which has a tarmac surface, is a triumph of modern engineering. Along its course are bridges over rivers, embankments in the depressions of the soil, enormous supporting walls, and long tunnels cut through the solid rock. On the whole, there is now a fairly well-developed system of inter-district communication, besides the transport routes for the mail service and motor traffic.

The cheapest and most ordinary means of transport in this region is the coolie. Such cultivators as lack capital and enterprise accept the job of coolie during the period of agricultural unemployment, and carry loads up to thirty seers. These coolies are less hardy and industrious than the sturdy porters of the Himalayas. Like the coolies of the lowlands, they carry their loads on the head or shoulder. They are unable to stand the fatigues of the more hazardous northern routes.

Next to the coolies, the chief means of internal transport are the teams of pack-ponies. They serve those places which have no roads for wheeled traffic. The ponies used towards the north are animals of the Bhotiya breeds, but in the central and southern tracts the *banyara* breeds from the Bhabars are more common. An ordinary pony often carries between two and three maunds and costs from Rs 50 to Rs 200. In 1912 their total number was 5,647.

Most of the roadside hill-shopkeepers, and the more enterprising peasants, own one or two ponies which serve the carrying needs of the neighbouring villages. The enterprising hillman is not only a muleteer, but also a petty trader and a middleman. He will carry the surplus produce of the village, such as potatoes, cereals, and turmeric, to the chief trade depots, and bring back salt, tobacco, *gur*, etc., in exchange. Large teams of ponies are constantly to be seen carrying the produce of the towns to the villages and vice versa.

Besides the hillman muleteers, the *banyaras* also undertake the carrying business of the region. They are recruited from among the Muhammadans and the Kumhars (potter-class) of the neighbouring plains districts. They keep packs of ponies, mules, and asses, which bring bales of cloth and grain from the Bhabars and take back bags of turmeric, chillies, and potatoes.

In places which are served by a fairly servicable road, and in the Bhabars, wheeled traffic is more common. Small bullock-carts carrying from six to eight maunds are the chief means of transport. These are mere "go-carts" as compared with those found in the plains of India, and are drawn by bullocks only.¹ Between Ramnagar and Ranikhet the cart-traffic is the heaviest, and it is almost monopolized by the people of Malla Sitor, Riuni, and Dwarsaon, who live by the roadside. The carts are chiefly used for the winter exodus to the Bhabars, for following the pilgrim route to Badrinath, and for local hire.² But recently, owing to the introduction of motor traffic, the number of carts, as well as that of ponies, has decreased considerably. They have lost the extensive custom of the Forest and Army Departments, as well as that of the private traders.

The forest produce, like the timber and fuel of the central and the eastern parts, is transported by river, as in Canada, at the end of the rainy season. Huge consignments of logs are floated down the rivers to the low-lying places with the help of gangs of workers, who line the whole river channel, to clear any obstacles that may hold them up. The system has the incomparable advantage of cheapness for the transportation in bulk of heavy goods. The rivers used for the purpose are the Kosi, the Sarju, the Ramganga, and the Kali.

Besides those already enumerated, there are some other special means of transport employed in the Bhabars. The most important are the ox and the buffalo. The ox, like the Tharu, is little affected by the malarious and sultry climate of the region. It is slow, steady, and cheap.

For the Tarai fens, the amphibious buffalo is the best means of transport. It is either yoked to a cart or loaded like a pack-pony.

¹ In the Bhabars and the Tarai carts exactly like those of the plains are used, and are drawn both by bullocks and buffaloes.

² The following places are served by the cart roads: Almora, Ranikhet, Baijnath, Vykiasen, Ramnagar, and Kathgodam. The total mileage is about 200 miles.

Next to the buffalo comes the slow-moving camel. It travels by night, and can cover five miles an hour. Its great height makes it peculiarly well-adapted for the carriage of the long and heavy *sal* logs and planks, which are hung vertically on either flank. Sometimes, when small faggots have to be transported, a sort of pack-saddle fitted with four great U- or V-shaped wooden forks is employed, the faggots being packed in two equal loads between the prongs of the forks. A camel will carry from four to five maunds.

For tiles, bricks, sand, and other building materials, road-metal, etc., asses and mules are used, the load being carried in two hempen nets slung on either flank of the beast, like panniers.

In places where there is abundance of vegetation elephants also are utilized. In hunting expeditions they form the chief means of transport.

Since 1920, however, all these beasts of burden have declined in importance, owing to the advent of cheap mechanical transport. Between Almora, Ranikhet, and Kathgodam, motor vehicles are plentiful, and as a result of keen competition freights are very cheap. Thanks to the advantages of comfort, speed, flexibility, carrying capacity, and easy accessibility, they have made a revolution in the trade and transport of the district. They have brought the district into much closer touch with the plains, and the ancient methods of commercial dealings, and the slow indigenous means of transport, have largely fallen into abeyance. Another great change brought about by the motor traffic is a decided improvement in the quality of the roads, which have been considerably widened and strengthened, and which are now served by first-class bridges. In this way the all-too-familiar cart-road of the past has been converted into the familiar motor road of the present.

CHAPTER XXII

TRADE OF THE HIMALAYANS

THE means of transport described in the previous chapter give us the clue to the volume and variety of trade in the two principal regions of the district. Owing to the nature of the Bhotiya transport, trade here must of necessity be on a comparatively small scale. The height and the structure of the Himalayas act as effective barriers to transport, and the only trade routes lie along the five extremely difficult mountain passes that lead into Tibet. The neighbouring province of Western Tibet and the sub-Himalayan district of Almora are "regions of contrasted production." The former is very bleak, barren, and inhospitable, and depends entirely for its food supply and other necessities, and its luxuries, on the adjoining British-Indian district of Almora. On the other hand, Nature has provided it with some very valuable products, such as high-grade wool, a large number of drugs, valuable stones, yak-tails, furs, hides, skins, ponies, goats, sheep, borax, and salt. This contrast in production has given rise to a system of mutual exchange and trade. To facilitate trade transactions, a sort of forwarding or *entrepôt* district, as Brunhes calls it, has developed here as elsewhere in similar circumstances. The inhabitants of this forwarding district act as middlemen, because owing to their semi-nomadic nature they alone know the difficult trails and passes, and possess the numerous beasts of burden especially adapted to the region. These nomadic middlemen, as we have seen, are the Bhotiyas, who hold the monopoly of the whole of the Tibeto-Almora trade.

Like the Zoms of the Chumbi valley in the eastern Himalayas, the Bhotiyas are enterprising merchants, thrifty, industrious, and intelligent. They hold the trade monopoly not because of any protective tariffs or special charters, but on account of the peculiar nature of the country. The inclemency of the climate and the rugged nature of the country make it impossible for an outsider to encroach upon their Nature-given monopoly. The less enterprising character of the hill people, and their poverty, on the one hand, and the shrewd

skill and incomparable activity of the Bhotiya on the other, make its continuance inevitable. The suspicions and fears of the outsider entertained by the Tibetans and their Government provide a further safeguard.

Near every important pass considerable villages have grown up, in which the merchandise of Kumaon is collected for transport across the Himalayas to various Western Tibetan trade centres. Generally speaking, the nearer a village is to the Tibetan centres the greater are its trading advantages. On the other hand, the nearer it is to Tibet, the more barren, difficult, and inhospitable is its situation. In other words, its prosperity varies with the rigour of its climate.

The Bhotiyas trade in Tibet during the summer and in the Almora district and the Bhabars during the winter. Owing to the snow, the frontier is not passable before the end of June, and remains open until the end of October. As a rule, the transactions between Kumaon and Tibet are carried on in July, August, and September, and usually two journeys are performed by each trader during this open season.

All the Bhotiyas of the five valleys are able to speak four languages—Tibetan, Pahari, Hindustani, and their own. They have been awarded trading rights by the Tibetan Government, and a formal renewal of this grant is necessary every year. Each valley has its own corresponding mart in Tibet, outside which the inhabitants of this particular valley are not allowed to trade without a licence.¹

As soon as the highest habitations are reached and the passes become negotiable, the laden flocks of sheep, goats, and *yaks* remain waiting for the arrival of the Tibetan envoy known as the *Sattu*, who formally declares the passes open. He comes accompanied by a single follower, with a few Tibetan sheep and goats as beasts of burden. He also carries a letter from the Tibetan district officer—the *Jungpun* (in whose territories the Bhotiyas will be trading)—addressed to the headman of the nearest British-Indian village. The letter contains the statement that all is in order on the Tibetan side of the frontier, and a similar declaration is expected from the headman. The envoy makes personal inquiries also as to cattle diseases.

¹ The Johari Bhotiyas are an exception, and are free to trade in every mart on account of the military service rendered to the Tibetan Government by their



JITWA SINGH SHIRPA (ON THE RIGHT) WITH HIS
COMPANION, JIN CHAKRA

Jitwa has seen service in seven Himalayan Expeditions
including the Everest and Kanchenjunga. No Asiatic has
climbed higher than he.

and the state of the public health. Being verbally assured that there is no disease either among men or cattle, he insists on a written statement to this effect from the headman. In some passes the envoy is presented with a stone, the Bhotiyas promising to forfeit its weight of gold should they introduce any disease into Tibet. On obtaining these assurances, and on the payment of the taxes due, the Bhotiyas are allowed to enter Tibet.

These taxes are far too numerous and very peculiar in character. For example, there is a tax on sunshine, known as *Ya thal*. There is a hearth tax known as *Tap thal*, levied from the Niti people. In some passes there is a *Lha thal*, or a tax for crossing the ridge. There are also grazing and land taxes. The method of computation and the system of payment are characteristic of the region. The tax is levied either per family or according to the number of animal loads, e.g. per hundred goats' loads. The payment is made in measures of saddle-bags: e.g., one saddle-bag (*karboza*) for one hundred goats' loads. In some passes a tax has to be paid in kind, with goods not available in Tibet. Thus the Mana people have to offer sandalwood and cloth and the twigs of certain sacred trees to the Chaprang temple. The envoy who collects these taxes is known as *Sargi* in Johar.

When the line clear is given, the headmen of all the nearest pass villages, or their representatives, accompanied by the leading traders, proceed to Tibet and offer their customary tributes to the respective Tibetan district officers (*fungpuns*). The tribute paid differs in different passes. The Johans pay cakes of coarse sugar (*gur-bheli*), and the Darms and Byans offer grain. In return for these presents the Bhotiyas receive certain Tibetan products.

After the ceremonies are over, the commercial operations of the season begin. Usually the Tibetan traders are the first to arrive in such pass markets as Milam or Garbyang, as their goats are superior, both in strength and hardihood, and are able to cross the snows earlier than the Bhotiya beasts. The transactions and exchanges of visits between Tibet and the entrepôt country are carried on between July and October.

In Tibet every Bhotiya has his *mitra*¹ or middleman. The *mitra*

¹ *Mitra* literally means a friend, but here it denotes a privileged trade correspondent.

is expected to collect all the Tibetan articles of commerce e.g. wool, rugs, skins, and hides, which the Bhotiya needs for his winter trade in Kumaon and the Bhabars. In exchange for these the Bhotiya offers all the necessities and luxuries e.g. cloth, grain, tea, sugar, and matches, required by his Tibetan correspondent. "One Bhotiya and one *mitra*" is the general rule, and any infringement of it is severely punishable by the *Jungpuns*. Exception is made to the general rule only where the new relations do not prejudice the old ones. These privileges of the correspondents are hereditary, and can be bought and sold like other commodities. But the right of disposal or transfer is possessed by the Bhotiyas alone, and not by the Tibetans. If the correspondent becomes bankrupt the Bhotiya must find a substitute. In such cases he prefers to deal with one who has an established reputation.

The appointment of a privileged correspondent or *mitra* calls for a small initiation ceremony known as *Suljmulji*. A cup of tea or wine is brought, from which the first sip is taken by the Tibetan *mitra* and the second by the Bhotiya. A few presents, which must be standard goods, are then exchanged, and the Bhotiya presents his correspondent with a white scarf or a special turban. An ordinary stone is broken into two parts, one portion remaining with the correspondent and the other with the Bhotiya. The representatives to the two men are to be recognized by these tokens. If the two parts fit together the representatives' bona fides are established.

Transactions are effected chiefly through barter, though cash also is used, especially in buying wool from the Tibetan villages, and by the richer traders. The smaller and the poorer traders are unable to provide cash, and hence are compelled to do business by barter. The value of grain is computed in saddle-bags, baskets, or skin bags, and that of coarse sugar by small flat cakes known as *pola*. Wool and hardware are weighed, the value of cloth depends on its width. The system of barter is less profitable than cash purchase, because the British-Indian silver rupee stands at a premium. Those Bhotiyas who are not provided with cash are at a disadvantage, and receive a smaller weight of salt, borax, or wool in exchange for their grain or cloth.

There are five groups of Bhotiyas, corresponding to the five passes

The first and most prosperous group is that of the Joharis, who use the Untadhura Pass (17,590 feet), which is open during July, August, and September. Having crossed the pass, the traders have the option of choosing either the eastern or the northern route. They often adopt the eastern and more direct route, which passes through Jantu (17,000 feet), and leads to Kungri-Bungri (18,300 feet). These high summits are guarded by massive snow peaks, and must be crossed without halting between sunrise and sunset. There are no camping-grounds or grazing or fuel facilities between them, and a slight delay would mean a terrible disaster. Untadhura is the most difficult pass. Its northernmost village is Milam (11,706 feet). The Tibetan marts chiefly frequented by the Joharis are Gynema (Khaigon), Chakra, Shivachilam, Darchan, and Gartok.¹

Gynema stands at a height of 16,500 feet and is only 25 miles away from the British-Indian boundary. Owing to its nearness to the trans-Himalayan snow-peaks, it is terribly cold at night. Like Gartok, it is a city of tents of every colour, size, and description, the most conspicuous being the black tents of the Dokpa-Tibetans.

Gartok is situated at 15,100 feet above sea-level, and is a busy place, full of tents of various shapes and sizes, representing the various trade groups. Towards the end of August a huge fair like that of Bageshwar is held, to which flock traders not only from India, but also from distant Mongolia, Turkistan, Lhasa, and China proper. After October, like the highest Himalayan villages, it is completely deserted. Since 1918 it has become the headquarters of the British-Indian Trade Agent.

The Malla Darma Bhotiyas use the Darma Pass (18,510 feet). Their principal marts are Gynema and Kunlang, and the highest pass village is Kuti.

The Bhotiyas of Byans and Chaundas have two passes—the Lankhpya-Lekh (18,150 feet) and the Lepu-Lekh (16,780 feet). The former leads to Gynema, and is the more difficult. But the latter is the easiest of all the passes, and remains open throughout the year. It leads to the Taklakot and Darchan marts, Taklakot being only 8 miles distant from British territory. The most important pass village is Garbyang, which is a very busy place immediately after

¹ Besides these, they are at liberty to visit any other marts they like.

the passes are opened. All the rich Dokpa-Tibetans are found here, buying and exchanging their season's requirements. They do not venture below it, as their beasts of burden are the pure yaks and the big Tibetan sheep. These die out if taken lower than 10,000 feet, as they are accustomed to the rarefied atmosphere and the intense cold of the high altitudes.

The people of the Niti valley use the Niti Pass (16,628 feet). Like the Untadhura, it has two branches, one passing through Hoti and the other through Charhoti. It is the nearest of all the passes to Tibet, and leads to Daba and Shivachilam. The chief entrepôt village is Niti (11,460 feet).

Next to Unta, Mana is the most difficult pass from Kumaon. Its height is 18,650 feet, and that of the highest village 10,560 feet. The most frequented Tibetan marts are Chaprang and Toling.

The principal articles of export to Tibet are cereals, as Western Tibet is a barren country largely dependent upon India for her food supply. The chief grains exported are rice, *madua*, wheat, barley, and *jhangora*. The greater portion of this demand is met from the surplus produce of the adjoining *pattis* south of the Bhotiya region. Other articles of export are sugar, *gur*, tea, tobacco, brass, copper, iron and aluminium utensils, hardware, silver, European and Indian cotton piece-goods, earthenware, porcelain, and other luxuries and semi-luxuries e.g. cigarettes, matches, and knives.

The chief imports from Tibet are salt, borax, wool, both raw and manufactured, gold-dust, bears' gall, furs, yak-tails, goat skins, live ponies, mules, sheep, and goats. The trade in the first two articles has diminished enormously owing to the advent of Italian borax and the competition from the salt traders from the plains. But this has been compensated by the increased returns in wool. In 1907 wool worth Rs 2 lakhs was imported, but in 1923 it increased to Rs 4 lakhs.

In October, as the winter advances, the Bhotiyas begin to transfer the Tibetan merchandise from the pass villages to the intermediate and base depots, which are situated midway between the Bhabars and the highest habitations e.g. Munsiri, Tejam, Dharchula, Nand Prayag, and Joshimath. These bases, in addition to serving as trade depots, are also the winter residences of the women and children when all their menfolk are engaged in the Bhabar trade. While they

are going down and coming up, the Bhotiya traders make excursions to the villages on either side of the route, where grain and wool are bartered or purchased for cash. After sales in the wayside villages, and in the two fairs at Jouljibi and Bageshwar, the remaining merchandise reaches, in January, the Bhabar marts, such as Haldwani, Ramnagar, and Tanakpore, where it is sold for cash or exchanged for *gur* or cloth. Usually two and sometimes three journeys are made to these Bhabar markets, until all the goods are disposed of. The upward transportation of grain and other goods begins by February, and is greatly facilitated by the three sets of depots, viz. the highest habitations, the intermediate camps, and the winter residences.

The Bhabar transactions are made chiefly in cash. It has been the bitter experience of some of the Bhabar traders that credit dealings with the Bhotiyas often result in bad debts. The environment of a Bhotiya is such that recovery of a debt often becomes almost impossible. His landed property and his dwelling are situated high up in the difficult passes, where no outsider would care to buy them. His animals cannot be recognized by an outsider, and he can easily give up going to one market and take to attending another. Such is the clan-spirit of the Bhotiyas that hardly a man is to be found among them who would be willing to divulge the whereabouts of the defaulter.

The Almora-Nepal trade is also considerable. It is carried on chiefly between the middle of November and the beginning of the rainy season, when the bridges over the Kali are often washed away and traffic intercepted. There are two routes through which the trade is carried on—namely, via Jhulaghat and Jouljibi. Jhulaghat has a suspension bridge and is open throughout the year. The articles of export and import are somewhat different from those of the Tibetan trade. Among the imports from Nepal fruits (oranges, plantains, and walnuts), grain, *ghu*, *phulwa*, hill paper, sheep, goats, cows, buffaloes, and ponies are the most important. The chief exports are oil, copper, and brass utensils, salt, sugar, tobacco, haberdashery, and woollen goods.

As a rule, the hillmen are lacking both in enterprise and capital, and it will be a long time before a professional class like the Marwaris (rich trading class of the plains) arises which will engage in whole-

sale trading operations. In the villages the *Baniya* of the plains is entirely absent, but in some of the larger villages or groups of villages a fairly rich and enterprising villager may be found, with a stock-in-trade consisting of small quantities of salt, oil, sugar, tea, and spices, and a few rolls of cloth. These goods are generally purchased at the nearest urban trade depot, such as Almora or Ranikhet, and as soon as the supply is exhausted it is replenished again.

But in the more remote and inaccessible villages the people have developed a special aptitude for trade. Here an enterprising agriculturist often starts a wayside shop and supplies the people with cloth and other necessities. The hill muleteers plying between these remote villages and the urban centres act both as middlemen and as carriers for these shopkeepers.

The commercial traveller, who is often a Muhammadan, has also found his way to every village, and solicits the custom of the peasant on his threshold.

Besides the commercial traveller, there is also the itinerant middleman, who is usually recruited from among the inhabitants of the tracts where the soil is very poor, e.g. Tikhun and Phaldakot. These men are regularly engaged in collecting the surplus produce in the hills and selling it in the Bhabars or the urban centres. They go to Garhwal, Nepal, and the less frequented regions of Danpur to buy *ghu* from the pastoral inhabitants. They buy it for cash at wholesale rates, and even make cash advances to the graziers. After purchase it is clarified and sold at a good profit in hill stations like Almora, Naini Tal, and Ranikhet.

Recently some new avenues of trade have been opened up. Thus the trade in fruits is assuming greater importance. The improvements in horticulture are considerably expanding the trade in apples, pears, and oranges. Again, owing to particularly favourable factors, various parts of the district have specialized to a certain extent in some special produce,¹ and the improvements in transport are facilitating their better distribution.

The demand for certain natural and forest products has likewise

¹ Thus the Salams produce *basmati* (superior rice), Salts chillies and turmeric, Shor and Gangoli oranges, Kali-Kumaon ginger, the Borarais walnuts and pomegranates, Askot plantains, Silors mangoes, and Ruini potatoes.

increased. Among such products honey, beeswax, and *phulwa* command a ready sale.

Honey is imported chiefly from the sunny central *pattis*. In Shor and Gangoli nearly every house contains a hive,¹ which in favourable years yields between one and two sears of honey. The system of apiculture is very primitive. The hive consists of a wooden box or a couple of stone slabs enclosing an opening in the wall of the house at a sunny point beneath the eaves. In the outer slab, or the side of the box, is an orifice through which the bees enter, and the side opposite to this is so arranged that it can be opened at will without disturbing the bees. Usually, however, it is opened only twice a year, once in March and again in September, when all the honey is taken out. The bee-master smokes out the bees through the entrance hole with a smouldering rag or with a smoking ember of wood, and leaves only one comb in the hive. The whole stock of honey is cleaned and graded before it is sold. The honey taken out in September fetches a better price, as it is considered to be of superior quality.

A very good variety of honey is produced by the bees that feed on the *Bassia butyracea* or *chura* flowers, which are in bloom between November and January. The valleys of the Kali, Sargu, and Ramganga in Shor and Gangoli abound in it. The honey is collected either from the hives or from the fragrant flowers themselves, and turned into a kind of *gur* (coarse sugar), which commands a high price.

Honey is either consumed as a substitute for sugar or exported to Almora, where it is used for preserves or with medicines.

The hives yield excellent wax, and so do certain species of wild bees. The collection of wild honey and wax is an exceptionally hazardous task. The wild bees often build their combs on the face of an overhanging precipice. The comb is taken by a man who is let down from the top of the precipice by a rope attached to his waist. He swings himself back and forth to reach the face of the precipice, which overhangs a river.² When he has gained a foothold the wild bees are either induced to leave the comb by throwing a tempting bait to a little distance, or are driven away by the smoke of smouldering

¹ Bees are regarded as lucky, and their departure bodes misfortune.

² This hazardous feat is confined to the more daring Bhotiyas of the north, where alone these bees are found.

rag. The honey is very dark, and quite unfit for human consumption, but is given to cattle and ponies. The wax is cleaned and exported. An average comb yields from six to seven seers of wax.

Phulwa is the oil pressed out of the stones of *chura* fruits (*Bassa butyracea*). The *chura* fruits ripen in July-August, and after the pulp has been eaten the stones are cleaned and pressed. A very thick oil is produced, which quickly coagulates, and looks like butter. It is sometimes consumed as vegetable butter. But its chief use is as a pomade and a salve for the healing of bruises, and it is exported in considerable quantities.



A FADIN GOAT WITH A SADDLE BAG.



THE BHOIYA MULLER WITH A FADIN YIBU

CHAPTER XXIII

FESTIVALS, CEREMONIES, AND PASTIMES OF THE HIMALAYANS

THE endless succession of mountain ranges that vanish in the dark blue sky, the beauty and majesty of the snow-peaks on the background, which seem to touch the stars, the profound silences which day and night fill the heart with awe,¹ no less than the sudden avalanches and blizzards which change the scene in a few minutes, have all left their impression on the religious ceremonies, festivals, and other pastimes of the Himalayans. As Atkinson well says "Nature here, in her most rugged and wildest forms and surroundings, with the awful solitude, overwhelms the mind, and fantastic forms and eerie sounds seem to speak of an ever present spirit-world, which compels men to see the supernatural in every bush, rock, and avalanche. Every rock and rivulet is dedicated to some saint or deity and has its appropriate legend"² Under such circumstances it is small wonder that the people are generally God-fearing and superstitious, even in their moments of joy and happiness.

Among the Bhotiyas the omnipresence of the supernatural and the sense of dependence on the Divine mercy have found expression in many peculiar forms of worship, ceremonies, and festivals, which can be interpreted only in terms of the influence of the environment.

Among the gods worshipped by the Bhotiyas, the highest Himalayan peaks—the abode of the mountain god Mahadev—are the best known. In Johar Nanda Devi and Hansling, and in Darma Panchachuli figure as the most prominent deities. Kailash, Mansarovar, and Badari-Kedar are also worshipped. At Martoli, at a height of 11,070 feet above the sea-level, on a silent, solitary, and impressive spot, whence a marvellous view is obtained, a temple has been erected to the Guardian

¹ Cf. "Great mountain peaks always excite superstitious awe in the minds of the simple peasantry who dwell in the valleys beneath them. Their height, their isolation from the everyday affairs of life and their grandeur impress men with a sense of their insignificance, persuading them against all judgment and reason that there are forces abroad beyond human ken" (*The Kangchenjunga Adventure*, p. 82).

² E. T. Atkinson, *North-Western Provinces Gazetteers, Himalayan Districts*, Vol. XI, p. 704.

Goddess Nanda—the daughter of the Himalayas and the consort of Mahadev—who is supposed to reside on the peak. In the second week of September an annual fair is held in her honour at the temple, when some ten buffaloes and more than three hundred goats are sacrificed, and nearly all the families of the fifteen highest villages of the valley are assembled and engaged in worship and merry-making.

The Panchachuli group is locally known in Darma as Miyula,¹ and the goddess of the same name inhabits its summit. While crossing the Darma Pass the Bhotiyas fasten a long pole across their bodies to save them from falling into crevasses, and propitiate the goddess by sacrificing goats to protect them from the mountain sickness due to the rarefied air.

Such is the awe inspired by the great snows that at every prominent place on the wayside whence a full view of the range is obtainable numerous strips of red and white cloth have been offered, and may be seen tied to some bush or tree. As soon as the Bhotiya reaches these spots he bows with folded hands to the range which is to him the abode of the mighty deity, and hums a short prayer.

Generally such prominent places are to be found after making a very steep ascent. At the top of such ascents a heap of stones or wood is accumulated at a spot adjoining the track. These sacred heaps and piles are known as *Kathburiya* or wayside goddesses, and every passer-by adds either a stone or a pine-cone to the heap, as a thanksgiving offering for the ascent to that point.

At Rilkot, the first of the mountain habitations in Johar, every Bhotiya family makes a similar offering to the mighty river Gori, which is held in awe for its all-devouring nature, for it levies a heavy annual toll of human beings and animals, since the track leading to Milam lies immediately above its bed. The eldest female member of every migrating family takes out a flour-cake, carries it round every member of her family, and finally throws it into the river.²

¹ Cf. Chomolungma—Goddess Mother of the World living on Mount Everest, and Kangima—Goddess Mother of Mount Kangchenjungha.

² Similarly in Darma the river Kali is worshipped as a water-goddess, and offerings are made to her. The names to the rivers and important streams correspond with those of the various goddesses of the Hindu religion, e.g. Kali, Gori, and Kosiki. Their awe-inspiring flow perhaps led to this system of nomenclature.

Again, while crossing a difficult pass or a dangerous bridge, the Bhotiyas place thorns and nettles under stones, thinking that the evil spirits residing at these places

Next to the mountain, river, and wayside gods, comes the weather deity. The weather here changes violently and suddenly, and these changes are terrifying, with their flashes of lightning, pealing thunder, violent winds, and sudden snow-storms and blizzards. Terrible consequences appear in the shape of landslips and avalanches. Finding themselves helpless before the mountain weather, the people worship it as the rain-god.

The universal and most popular rain-god is Gabla, who is worshipped with offerings of goats and cakes. He dispels both snow and rain, and brings prosperity in business.

Whenever there is a long spell of wet weather, and the people weary of it, the worship of the god Dharmua is practised. Two poles are thrust into the ground. On the top of one of them is tied a yak-tail and an iron trident, and on the top of the other an image of the human form. Music is played and a goat sacrificed. If fine weather follows, this means that the worship was successful. Dharmua is worshipped above Bugudyar only. Below Bugudyar Hardyul is the rain-god. In Darma the rain-god is Kungr. Unlike Dharmua, Kungr brings rain as well as stops it. When he is asked to stop the rain he is offered dry flour, and when the people want rain wet flour is offered.

The flocks of pastoral people often stray or are lost, and on such occasions the shepherd gods Runiya and Sain are worshipped. Like his nomad worshippers, Runiya is always wandering from village to village, and has steeds which he rides by night in order to find the lost flocks.

Similarly, when any of their animals are sick the shepherds worship the gods Sidhuwa and Bidhuwa. They are supposed to be two brothers, who will come to the rescue of the ailing beasts.

Besides these gods, each village has its own appropriate deity, who deals with its peculiar problems. The temples are mere worship poles with branches, and are decorated with dangling strips of cloth and yak-tails. The offerings to these deities are either goats or sheep or flour cakes.

Of all the various ceremonies, that which is performed in honour of those deceased who have died far away from their native place

will no longer torment them. Baskets full of thorns are similarly placed on the roofs of the houses when the final downward move takes place.

is the most peculiar and interesting. After the dead body has been cremated, a small bone of the deceased person is brought back to his ancestral home by some of his relatives, in order to ensure that his spirit shall join those of his ancestors. The bone is wrapped up in a cloth and kept inside a box. Whenever the bearer crosses a bridge or a difficult portion of the track, he first lays a thread of wool along the track or the bridge in order to guide the spirit, and then proceeds, carrying the box containing the bone. The idea underlying this practice is that the departed spirit may experience insurmountable difficulties in finding the way home, but if the route is outlined with a thread the soul finds no difficulty in continuing on its journey. In rich families a considerable part of the track is so outlined, but among the poorer people only the difficult portions of it are thus marked out.

The women-folk of these nomads, especially those of *pargana* Darma, are left alone by the men for a considerable part of the year. This has led to the development of clubs or guilds, composed entirely of women or girls of a particular age. The young folk, whenever present in the villages, are privileged to be admitted freely to these clubs, but the management rests primarily with the unmarried girls and such of the married women as are not yet mothers. Strangers are admitted only when the female members accept them. Every village has its separate village club, known as *rangbang*, but large villages contain more than one. The club meets either in a house or on a level spot, which is known as *rangbang kuri* (*hambaghar*),¹ or the club-house.² Here a fire is kindled in the centre by the young girls, and round it sit all the young men and boys, accompanied by the young unmarried girls and the married women who are not yet mothers. They pass almost the whole night in singing, dancing, eating, drinking, and smoking.³ Sometimes the girls invite the boys of the neighbouring villages, act as hostesses, and supply food and bedding to the guests.

The invitation is conveyed by means of signalling. Two girls hold the ends of a white cloth and wave it in the air. Owing to the

¹ Exactly similar dancing halls called *radghars* are to be found among the Gurungs of Central Nepal.

² A former district officer, Mr Colvin, tried unsuccessfully to abolish these club-houses.

³ Smoking among the Bhotiya women and children is very common, and as a rule all of them smoke.

elevated situation of the villages, the waving cloth is seen for miles and serves its purpose very well. About sunset parties of young men from the different villages pour into the club, whistling and waving pieces of cloth. This gesture of waving cloth is also used in bidding farewell, and looks very charming when seen from a distance. Courting and match-making are the chief functions of these clubs, and usually every marriage is arranged here. Premarital sexual experience and companionate marriages are quite usual, and even love-children (*rangbang ka khenta, khenti*) are not uncommon.

The singing and dancing in these clubs take the form of folk-songs and ring dances. The dancers, who are also the singers, form themselves into a ring and shuffle from left to right, the movement being sometimes slow and sometimes fast. Both men and women are admitted to the dance. Occasionally they mix indiscriminately, but often each sex keeps to its own sector of the ring. The dancers move to the rhythm of a song repeated by the performers themselves. The song is sung in chorus, first by the male and then repeated by the female dancers. When one sex sings the other is quiet, but goes on dancing in a ring. Sometimes the leader of the dance stands inside the circle, and plays on a drum, directing the dancers. The sense of rhythm, the contrast of voices, the balancing movements of the dancers, the slow and sudden leaps, and the music of the instruments are delightful and fascinating in the extreme. There are various forms of these ring dances. The best known are *Dandyala*,¹ *Chamfuli*, *Dhuska*, and *Dhurang*.

The *Dandyala* is roughly like the *Rasa-Garba* of the Gujratis (Bombay Presidency). Men and women carry small sticks, timing the rhythm of their dance and song by striking the sticks together.

In the *Chamfuli* the rhythm is marked by clapping the hands, or by joining and separating them. Among the Johari tenants this is the most popular dance.

The *Dhuska* has many variants. Sometimes the circle is formed by alternate male and female dancers, sometimes the sexes are segregated in different sectors. Sometimes each dancer holds the waist of the dancer next to him or her; sometimes a loose circle is formed by joining hands. In the *Jaula Dhuska*, or twin circle, the male dancers

¹ In Nepal the most popular dance of the nomad clubs is known as *Sorti*.

form the lower ring, bearing on their shoulders the upper ring of female dancers. The song is repeated in turns by either ring.

Dhurang is the dance held in *pargana* Darma in honour of a man or woman deceased. A suitable spot is selected in a field and here all the people of the village dance at night. All these dances exercise the muscles and develop a sense of rhythm and balance.

Of the songs, those sung during the first stage of the ring dance, and resembling the hymns, are known as *bajyu*. They celebrate the mountaineering exploits of their (Bhotiya) ancestors, or praise the gods, or are descriptive of thunderstorms and other natural phenomena. The similes are drawn chiefly from the surrounding landscape. They are transmitted word for word and line for line from generation to generation, and there is hardly a Bhotiya who cannot recite some of them. In addition to these, every Bhotiya, while travelling in the lowlands, tries to remember some of the lowland songs, and on reaching home introduces them in the clubs and dances. These songs are a species of ballads, and are full of humour, levity, and wantonness.

The musical instruments are few in number. The shepherd's pipe or *bansuli* is the best known. It is made of *ringal* (small hill bamboo) and there are two varieties: the single pipe, known as *bansuli*, and the double pipe, *muruli*. The players have learnt a few familiar tunes, which they repeat while tending their flocks in the distant hills and valleys. To a traveller in the mountain by-ways its notes are very pleasing.

The dium or *hurka* is played with the fingers instead of sticks, and is the preserve of the men. There is also a very small iron instrument known as *binai*, a sort of Jew's harp, which is placed between the lips and played with one finger. It is usually but not always played by the women.

Of the various games, the young children and boys play "Sheep and Shepherd." It is just like the game of "Hide and Seek." A number of boys pretend to be sheep and hide themselves, and they have to be found out by one or two shepherds. This apparently owes its origin to the pastoral environment of the people.

The elder people play an indoor game on a chequerboard. Like "Sheep and Shepherd," its name bears the stamp of the environment,

it is called "Tiger and Goats" (*Bagbakari*) It resembles the English game of "Fox and Geese"

The young men indulge in slinging stones or in snow sports, but their favourite sport is pony-racing

Of the chief Nature festivals celebrated in the sub-Himalayan region, the first is that held at the advent of the spring, and called, after the season, *Basant Panchami* The long, bitter, weary spell of cold, with its accompanying hardships, seems to be nearing its end The arrival of spring appears to be imminent, and in its train will come birds and flowers, warmth, happiness, and prosperity The buds swell on the naked fruit and chestnut trees, and everywhere there are signs of the revival of life The contrast between the seasons here is more marked than in the plains In order to accord the spring a more hearty welcome, the festival is held in the first week of February, when the days have become a little longer and a few flowers have opened The day is an occasion of social gathering and jubilation Worship and salutation are offered to the spring and the Goddess of Learning The sisters and daughters take young shoots of barley and fix them in the head-dresses of their elders, after imprinting the ritual marks on their foreheads with red powder On this occasion all wear yellow clothes The women dye their sheets yellow and the men their caps Yellow handkerchiefs are also exchanged as presents, and a feast is held in every house

The second Nature festival is held approximately in the second week of March Spring now triumphs everywhere, and every bush and tree bear signs of her majesty The chirping of birds is heard, and the rhododendron with its bright scarlet flowers, and the peach trees with their rosy blossoms, adorn the landscape and the fields and gardens The coming of the flowers, coupled with the advent of the Hindu New Year, is celebrated as *Phooldey*¹ or "the flowers on the threshold" It corresponds to the English May-day

In parts of Salts, Kaklason, and Kosiyan, the whole of the month of *Chait* (March-April) is spent in merry-making In these places all the thresholds of the house are daily cleansed and flowers strewn over them On the first and the last day a special worship is observed, rich meals are prepared, and the whole day is spent in feasting and amusement

¹ In the Chakrata-Himalayas a somewhat similar festival is known as *Goga*

But elsewhere in the district the first day of the month alone is celebrated. All the unmarried girls and young boys rise at the break of day and collect as many flowers of all kinds as possible. Rhododendron-flowers and peach-blossom, which abound at this time, are those most commonly gathered. Rice smeared with turmeric and red powder is sprinkled over the flowers. After smearing and adorning the thresholds of their parents' houses, they go and repeat the same ceremony at the doors of their neighbours and relations, and chant a short verse praying for the prosperity of the householder and the return of many more such occasions of worshipping his threshold. In return for strewing the flowers, the girls receive presents in the shape of cloth, rice, *gur*, food, or cash. The rice is ground into flour and mixed with coarse sugar, and cooked into a special kind of food known as *shai*, which is eaten in the evening by everybody, the little girls being served most liberally.

From the time of this feast, the low-caste people, especially the Hurkiya (drummer) and Badi¹ (singer) clans, go about the village for a month, singing and dancing and receiving presents in return, either in cash or in kind.

The advent of the rainy season is similarly celebrated. This festival is known as *Haryala*, or "the festival of the rains." It is celebrated on the first day of *Shrawan*, which falls about the middle of July. Some ten days previous to this date seeds of five or seven kinds, viz. barley, wheat, mustard, pulse (*goth*), and maize, are mixed together and sown, solemnly and with due ceremony, by the head of the family or the family priest, in small baskets full of earth, or in a small bed of earth prepared near the place where the household gods are kept. Water is sprinkled daily at both the times of worship, and the place is fenced with cotton thread. On the last day of the month of *Asar*—that is, one day before the actual celebration—a kind of mock weeding is performed with a wooden hoe, and as many kinds of fruits as possible are placed near the young shoots. In the midst of the young growth are placed clay images of Shiva and Parvati and their offspring. The images are prepared beforehand by the girls and women of the family, and are gaily painted. In many cases they are exquisitely fashioned. Of recent years love of idleness and scant appreciation of

¹ Similar tribes in Nepal are known as *Gama*.



A SUSPENSION BRIDGE



A GROUP OF HILI MAN MUTILERS

the dignity of labour have caused the neglect of this art, and nowadays housewives order their poorer neighbours' wives to make the images for them

When the images have been so placed, the mistress of the household, dressed in her best, offers due worship assisted by the family priest. The priest chants a Sanskrit *mantram* (hymn), which says "O Harkali, I bow unto thee, thou art begotten of Har's name and loved by Har. Thou remainest ever amidst the green paddy fields and takest away the sufferings of those who bow before thee." The festival is celebrated yearly as the anniversary of Shiva and Parvati's marriage.

The remaining ceremony is observed next day—that is, on *Shankranti* Day. This day's worship is performed by the master of the household. He cuts down the green stems, which, after they have been offered to the gods, are worn on the head-dresses of the young and old alike. In the daytime the daughters and sisters, with small trays containing a little heap of red powder, rice, and a few young shoots, stand before the household gods, when all the males of the household have assembled, and dipping their fingers into the powder carefully trace a thick vertical red line upon the forehead of every male. After the line has been drawn a few seeds of rice are placed in the middle of it, and the green shoots are gracefully arranged on the head-dress. They begin with the eldest member of the family, and repeat the same ceremony until the youngest is reached. In return they receive presents in cash or kind.

This festival is regarded as one of the most important, and on this day even the cattle rest and are not yoked. To say to a hillman, "May you not eat the *Haryala* feast!" is regarded as the worst form of curse. The whole day is spent in throwing stones, or eating, singing, and otherwise merry-making. The ceremony of wearing the green shoots finds its parallel in the practice of wearing roses in England, and the sowing of five or seven seeds is somewhat similar to the solemn ritual of the annual sowing of the five plants by the Emperor of China at the ceremony instituted some 2,800 years before Christ by the Emperor Chin-Nong.

Wallgiya or *Ghi-Shankranti* is observed on the first day of *Bhado*, about the middle of August, when the fields and the cattle are yielding

their utmost. Hence curds and vegetables are offered by all to those in authority over them. The tenants offer them to their landlords and the young people to their elders. All make it a point to consume some clarified butter. Butter is applied also to the forehead. The local craftsmen and artisans present their own manufactures to wealthy persons and those in authority. In return for these they are given presents in cash and kind, according to the quality of the products. This custom is fast disappearing, but if encouraged it would be the best and the most unobjectionable form of "protection" of the indigenous cottage industries.

The arrival of the winter is heralded by the feast of bonfires—*Khatharuwa*. Huge quantities of fuel and hay are collected by the villagers, and a bonfire is made in a prominent place on waste land of the village, on the first day of *Asoj*, in the middle of September. Immediately after sunset, when it is beginning to grow dark, the fire is kindled, and the young children and boys, bringing flowers and cucumbers, arrive on the scene. They throw portions of the cucumbers and a few of the flowers into the fire, and beat it with long light sticks, uttering the words *Bhelo! Bhelo!* The young men and boys leap across the fire and eat cucumbers. If it rains on this day, this means victory for the cow, and if it is a fine day, this means the triumph of the bonfire. A local proverb says that from this day winter's onward march begins, and compels the people to spread their blankets over their heads, which hitherto were drawn up to their shoulders. At night, when the bonfires are reduced to ashes,¹ evil spirits are driven out of the cattle-sheds by means of lighted torches. The torches are taken into every corner of the sheds, and this is supposed to make it too hot for the spirits to linger any longer.

Ghugutia is held at a time when the winter is most severe, i.e. in the middle of January. Small images and little cakes of flour are baked in mustard oil or butter and strung as necklaces with an orange in the middle. Every child below the age of ten is given and wears a necklace. In the morning the children, shouting "*Kale Kale*," call the crows and other birds, and offer them portions of these necklaces. The birds and crows are fed also with rice and other grain. The

¹ The word *Khatharuwa* is also used figuratively in speech, meaning complete destruction. A similar festival in Chakrata is known as *Dipsa*.

feast affords a very welcome relief to the half-famished and cold-bitten birds, which are almost starved on account of the severity of the winter. Men, women, and children eat rich and heat-giving food, because hunger is abroad, and digestion most vigorous owing to the cold. The necklaces are also exchanged among neighbours. The children on this day are in the highest spirits. The *Kangali Bihu* festival of Assam is very similar to this feast.

In addition to these festivals, weather-worship in the sub-Himalayan region takes another form. In the villages of this region there is an office whose holder is called the *Oliya Gusam*, or the "Hail Lord." He is a medicine-man and rain-maker, and has the power of averting hail-storms. He is paid in kind at harvest-time, and it is his duty to drive sacred nails into the trees within his jurisdiction, to ward off the dangers of hail-storms. Whenever there is a drought he has to shake these nails, as this is supposed to bring early rain.

It is believed also that rain will fall if some of the temples, e.g. Gajaleshwar and Bhatneshwar, are defiled by throwing cooked rice into them. The gods send the rain to clean their temples.

The festivals and ceremonies connected with agriculture are held at either seed-time or harvest-time. In Kumaon the first sowing of the seed in both the crops, *kharif* and *rabi*, is attended with a little ceremony known as *Khyo*¹ a ceremony of blessing the fields before they are sown. The *Khyo* for paddy sowing is observed in the fields where paddy is to be sown, on an auspicious day fixed after consultation with the village astrologer, sometime in March or April (*Chant*). The *Khyo* for wheat is celebrated in the fields near the homesteads in the month of October. There are two kinds of *Khyo*, according to the implements used in preparing the fields. Where the hoe is used it is known as *Kut Khyo*, and where the plough it is called *Hal Khyo*.

In *Kut Khyo* a small piece of land is prepared beforehand, and on the day appointed, after worshipping the household gods, the owner of the field takes a few handfuls of seeds from the granary and sows them in the plot so prepared. Mud is then spread over the seed by means of a hoe, and rice, red powder, and a slip of lighted torchwood

¹ Cf. the Brahman ceremony of *Raak Na*, or first official ploughing, in Bangkok.

are then offered to the seed-bed. The worship may be performed either in the morning or in the afternoon.

In *Hal Khyo* the ploughman receives red powder and a copper *pice* from the owner, and applies the powder to his forehead, as well as to the foreheads of the bullocks, and to the plough. After this he ploughs the plot of earth, and then the seed is sown. As a rule, he receives his meals for the day at the house of the landlord. The grain of these plots, when harvested, is used in the ceremony known as *Nawam*.

When the crops are ripe and ready for the sickle a few ears are brought to the house on some auspicious day and offered to the household deities. A few are then stuck above the lintels of the doors with cow dung. This ceremony is locally known as *Kalam*. Harvesting commences after this ceremony is over.

When the harvesting is finished, and the grain stored inside the house, a day is fixed in consultation with the village *joshi* (astrologer) on which the new corn is first to be cooked and eaten. Special dishes are prepared, and one of them is spread with the yellow ears. Before it is eaten it is offered to the village and household gods, and especially to the Bhumiyān or Kshetrapāl—the tutelary god of fields and boundaries. The priest or the head of the family performs the *Nawam Shradh*, or the offering of new grain to the manes, in which the grains of the *Khyo* fields are used. A simple prayer for general prosperity is also offered.

There are two such ceremonies, one for the *rabī* and the other for the *kharif*. Anyone who eats the new corn without first offering it to the gods incurs their wrath. Such a dereliction is believed to result in a poor harvest next year. On account of the frequency of this ceremony nearly every village possesses its own temple of Bhumiyān. Bhumiyān, as we have seen, is the village god who looks after the harvest and the fields, and presides over the ceremony of *Nawam*. The ceremony of *Ganoni* in Gilgit (Kashmir) resembles *Nawam*.

Bhumiyān is worshipped also when there is an extraordinarily rich crop in any of the fields. The crop is reaped, and Bhumiyān is worshipped in that particular field with the usual ceremony.

Another similar ceremony is known as *Agnai*. Immediately after

the wheat harvest in May every household takes a sufficient quantity of wheat, usually one or two full winnowing scoops, and lays upon it a few bullock's hairs and a bunch of wheat-ears. The whole is then closely covered and kept in a safe place inside the house until the month of *Shrawan*. In *Shrawan* (July–August), on some auspicious Tuesday or Saturday, the seeds are milled and cooked. Every house has its own ceremony, but in some villages a joint ceremony is observed at the village temple, and the whole stock of grain is collected and cooked. Priests, poor people, and the villagers are then fed with it. Sometimes this stock is utilized in tiding over the temporary scarcity of food before the harvest. Such times are said to coincide with the period when the peach is in flower, or when it ripens, and when the appetite is at its best.

In addition to the agricultural ceremonies, there is held yet another festival, known as *Haliya Dahar*, on the 10th day of *Margshir* (November–December), when the wheat sowing is completed, and the season's agricultural labours are at an end. The ploughman is entertained on this occasion in return for his hard and laborious service throughout the season. For in Kumaon the plough is shunned by the upper classes, and a special class of ploughmen has sprung up who do all the ploughing. The festival is not so widespread as the *Haryala*, and is celebrated chiefly in the Pali subdivision. On the day of celebration the houses are cleaned, and the threshold is decorated with designs drawn with a paste of rice flour and water. Cakes and other delicacies are prepared in the evening instead of the customary loaves. At about seven o'clock in the evening the plough, the pestle, and the mortar are worshipped by the ploughman, who acts both as priest and worshipper on this occasion, in spite of his belonging to one of the depressed classes. This is because of his close association with the plough.

The actual worship consists of the following ceremony. The flat, pointed piece of wood in which the ploughshare is fixed is brought to the pounding-yard. The iron share is removed and the cavity so left is filled with grains of sesame and barley. Mustard oil is poured from one end of the plough lengthwise, in such a way as to trickle down to the other end. Sandalwood, red powder, flowers, sweets, cakes, and a light are next offered to it by the *haliya* (ploughman).

The ceremony ends when the ploughman kicks the plough, uttering a benediction, which says that the owner of the plough is like a king, and expresses the hope that he and his wife may always act in unison. The whole ceremony is completed within half an hour.

For officiating as priest, the *halya* receives clothes, raw and cooked food, and other gifts, in money and kind, from his landlord. Even the plough-bullocks are not forgotten, and they receive a special feed in their stalls. The *hal* (plough), *ghani* (hand-mill), and *kargha* (spinning-wheel) worship of Bengal closely resembles this practice.

In Nayas (Pali) the festival is celebrated jointly by the entire village, and not, as elsewhere, in every household. Here all the ploughs of the village are collected together in one spacious pounding-yard, and made to stand upright, supported on the yoke. The ploughman so kicks them that they all fall down together.

In Harnoli only half of the village lying on the hither side of the river celebrates it, the other half of the village does not observe it.

Just as Bhumyan is the tutelary god of the harvest and the fields, so Badhan and Chamu are the tutelary gods of the cattle, and look after their welfare. When a cow calves the first milk is presented to these gods. The worship of Badhan is observed on the 11th day after calving, and that of Chamu on the 22nd. Chamu comes to the rescue when cattle diseases prevail, and is especially worshipped on such occasions. The use of old and dirty pots is distasteful to him, and scrupulous attention paid to cleanliness pleases him above all things.

Gwalde is the god of the herdsmen. He is worshipped twice a year, in the midst of the forest, either in May-June or in June-July. The priests are the herdboys, who cook rich cakes in the forest, and entertain all the neighbouring herdsmen. Some of the cakes are brought home and distributed among the younger folk, the would-be herdsmen of the village.

Among the mountaineering sports which are periodically practised in the sub-Himalayan region, the hurling of stones with the sling is the commonest, especially at the fairs of Devidhura, Dwarahat, Uprani, and Masī. The villagers divide themselves into two teams, which are pitted against one another. The object of contest is either to force the passage of a stream or to gain possession of a stone pillar.

or some such object. Each party uses its slings, and with the singing of a martial air the contest begins. Formerly this was a most dangerous sport, bones were frequently broken, and many fatal accidents occurred. This sport is known locally as *Bagwal*. Whenever a snow-fall occurs the villagers pelt one another or the passers-by with snow-balls.

Glissade or sliding down from the top of a hill, when the dry pine-needles make it slippery as ice, is another sport which the mountaineers alone can enjoy. Races are held on such slopes. A bundle of pine-needles serves the purpose of a *ski*. The sport is known as *Ghusghus*.

Swinging on a seat slung from an overhead bough by ropes or iron chains is a very popular sport. Men and women sit or stand on the seat and swing themselves back and forth until they are giddy.

Another crude form of roundabout is made by erecting a pole on the top of which a horizontal pole or plank is pivoted. The whole structure looks like a T. At either end of the horizontal pole sits a boy or a girl, evenly balanced, and they then swing round and round the vertical pole until they are dizzy and tired of the fun. This game is called *Rwam Chawam*, from the sound produced by the revolving pole, and is a favourite sport of the herdboys in the forests.

Among the indoor games and pastimes, "Fox and Geese" and draughts are the most common. During the winter nights the telling of tales and the asking of riddles round the fire is another favourite pastime.

Among these peoples singing and dancing are indulged in only when they attend a fair. Of songs, the *barra* and *bhagnolas* are the most popular. These are a sort of questions and answers in verses composed on the spur of the moment, and sung alternately by a male and female singer. The questions and answers are full of personal references, clothed in wit and satire. The *hurka* (drum) is also played on such occasions.

APPENDIX A
BHOTIYA SUMMER AND WINTER RESIDENCES

JOMAR, OR THE GORI VALLEY (NORTH OF THE SNOWY RANGE)

Summer Residence	Caste of Residents	Number of Families	Winter Residence	Name of River Valley
1 Milam	Milamwals, Panku, Dham-saktu, Rawat, Nitwal, Nikherpa	600	Tejam, Bhanskot, Tintua, Bhamskhal, Bhanarkot, Kwitu, Rithbagar, Dotla, Kanoli, Dhanyar, Dhodhunga	Ramganga (eastern), Jonkula, Sarju, Mahargar
2 Pachu	Pachwal, Nitwal	40	Sungarhi, Dhura, Baragar	Pungraon Hills
3 Ganghar	Ganghara, Marwal	38	Thal	Ramganga
4 Bilju	Biljwal, Dongsapa	40	Dwoti, Musaria, Chaunsala	Pungraon
5 Burfu	Burfwal, Jangpang, Namguli	100	Kolia, Basora, Mawani, Bhakunda, Banori, Jhalori, Patat	Ramganga, Gori, Bhujgar, Mahargar



A TOKI WITH HIS NECESSARY FOUMENT
Not that Toki is a Toki Toki Toki



ELPHANTS AS BEASTS OF BURDEN

6	Mapa	Mapwal, Rawat, Nitwal	15	Polia	Bhujgar
7	Lwan	Lwanl, Nitwal	10	Bhanarigaon	Jonkula
8	Martoli	Martolia, Nitwal	200	Balk, Bhanarigaon, Amthal, Debi- bagar, Nmlabagar	Ramganga, Sarju
9	Tola	Tolia, Nitwal	60	Bhanskoti, Gular, Gagarpani, Choribagar, Pharsoli, Churnadhar	Bhujgar, Gori
10	Sumtu	Sumrwal, Nitwal	4	—	—
11	Khenlanch	Khunchal, Nitwal	8	Baraun	Patu Chowkoti
12	Rilkot	Rilkotia, Nitwal	8	Baikuri, Kirai, Saling	Sarju
13	Ralam	Ralamwal, Darma	20	—	—
14	Laspa	Laspwal, Dhapwal	40	Khani, Polhari, Luntu	Kamsyar, Gori

DARMA MALLA

OR

(I) THE DHAULI (DARMA) VALLEY

Summer Residence	Winter Residence	River Valley
1 Sipu	Galanti	Dhaul
2 Marcha	Galanti	Dhaul
3 Tidang	Kalika	Dhaul
4 Dhankar	Kalika	Dhaul
5 Go	Garbagar	Dhaul
6 Film	Charcham	Dhaul
7 Bungnal (Baun)	Gothi	Dhaul
8 Dotul	Dudi	Dhaul
9 Dakar	Garbagar	Dhaul
10 Sungnal (Saun)	Nigalpani	Dhaul
11 Dugtung	Nigalpani	Dhaul
12 Baling	Galanti	Dhaul
13 Nagling	Galanti	Dhaul
14 Chal	Jumbagar	Dhaul
15 Syala	Jumbagar	Dhaul
16 Dar	No winter residences Throughout the year the same residence because the snow is not very heavy	
17 Banling		

(II) BYANS, OR KALI VALLEY

Summer Residence	Winter Residence	River Valley
1 Kuti	Dharchula	Kali
2 Rung kang	Dharchula	Kali
3 Naba	Dharchula (Nepal)	Kali
4 Gunji	Tangtanti (Nepal)	Kali
5 Nepalcho	Dharchula	Kali
6 Garbyang	Dharchula (Nepal)	Kali
7. Budi	Tinkur (Nepal)	Kali

(III) CHAUNDAS, OR THE LOWER KALI VALLEY

This is altogether different from Byans and Darma. Its climate is so mild that people can live here throughout the year. Some of the colder villages have two sets of houses, one at the mountain-top and the other on the banks of the Kali. The total number of families living in the valley is 300. All are situated on the river Kali. The following are the chief villages —

1 Jipti	6 Sirdang ¹	11 Punla
2 Gallagar	7 Rung	12 Susa
3. Tankula	8 Pangla	13 Rungto
4 Bungbung	9. Gingham	14 Pangu
5 Sirkha ¹	10 Bulthing	15 Rungim

¹ Two sets of houses

APPENDIX B
THE ROPAI EXPENSES
(See Chapter IX)

THE system of paying the labourers is as follows —

1 BOLLIVAS, or hired day labourers

They are at liberty to have their meals at the landlord's place. In addition, they get some payment in cash or kind, which varies between 3 and 5 annas

2 PALTIVARS, or those who repay labour by labour (mutual exchange)

Some of them take both meals at their own houses and some at the house of the neighbour with whose transplanting they are helping. It matters little which they do, because they in their turn will have to repay him. As a rule, they take their breakfast at their own homes and the mudday meal at the neighbour's house. In the evening they receive 4 to 6 loaves and 2 to 4 cakes for their supper. They are treated as guests

3 BAIKARIYAS, or labourers who are paid in advance

Two full meals one full meal in the morning plus 4 loaves and 1 or 2 cakes

4 HALIYA, or ploughman

Gets three meals. He is paid both in cash and kind, cooked and raw food. In addition to three full meals, he gets 4 and 6 loaves, 2 to 4 cakes, and 2 seers of paddy

5 HURKIYA, or drummer

He receives most attention. In a way, he is the overseer, and everything depends upon the attention he pays to his work. He is the task-master. He gets in addition to his morning meal, 6 to 8 loaves, 4 to 6 cakes, vegetables, 2 seers of paddy, 6 to 8 annas in cash, and some articles of clothing

6 BULLOCKS

They are offered barley—flour-balls weighing about $\frac{1}{2}$ seer.

APPENDIX C

MARKET DAYS IN THE BHABARS AND THE TARAI

BHABARS

Haldwani	Every Tuesday
Ramnagar	Every Wednesday and Sunday
Kaladhungi	Every Friday
Bailparao	Every Thursday
Kotah	Every Saturday
Chorgalia	Every Friday

TARAI

Khatima	Every Tuesday and Thursday
Satargunj	Every Sunday and Thursday
Kitchya	Every Friday and Monday
Rudarpore	Every Wednesday
Gadarpore	Every Sunday
Kelakhara	Every Friday
Bajpore	Every Monday
Sultanpore	Every Wednesday
Kashipore	Every Saturday and Tuesday
Jaspore	Every Friday
Thakurdwara	Every Friday

APPENDIX D

THE HILLMAN'S MONTHS AND SEASONS

AND THEIR ENGLISH EQUIVALENTS

Chait is equivalent to March 15th to April 13th.
 Baishakh is equivalent to April 14th to May 14th.
 Jaith is equivalent to May 15th to June 15th.
 Asar is equivalent to June 16th to July 16th
 Shrawan is equivalent to July 17th to August 17th
 Bhado is equivalent to August 18th to September 17th.
 Ashwin (Asoj) is equivalent to September 18th to October 17th
 Kartik is equivalent to October 18th to November 16th.
 Margsir is equivalent to November 17th to December 15th.
 Pusa is equivalent to December 16th to January 14th
 Magh is equivalent to January 15th to February 12th
 Phalgun is equivalent to February 13th to March 14th

SEASONS

The classical division of twelve months into seasons is six, whereas in Kumaon parlance there are three seasons only

MONTHS	CLASSICAL DIVISION	KUMAON PARLANCE
Chait- Baishakh }	<i>Basant</i>	} <i>Ruri</i>
Jaith- Asar }	<i>Grishm</i>	
Shrawan- Bhado }	<i>Barsha</i>	} <i>Chaumas</i>
Asoj- Kartik }	<i>Sharada</i>	
Margsir Pusa }	<i>Haimant</i>	
Magh Phalgun }	<i>Shushr</i>	} <i>Hyun</i>

APPENDIX E

WEIGHTS AND MEASURES

NOMINAL MEASUREMENT OF MR G W FRAILL

2 seers of seed of wheat	= 1 nali of land
40 seers of seed of wheat	= 1 bisi
12 yards by 20 yards = 240 square yards	1 nali
240 yards by 20 yards = 4,800 square yards	= 1 bisi

1 acre = 20 nalis or 1 bisi (roughly)

1 nali of weight	= 16 <i>muthis</i> or handfuls
1 pirai	= 16 nalis
1 nali	= 2 seers
40 seers	= 1 maund
1 seer	= 16 chataks
	= 2 lb

1 rupee	= 16 annas
1 anna	= 12 pies or 4 pice
1 rupee	= 1 shilling and 6 pence.

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लेखक

Author Pant, S. D.

शीर्षक

Title The social economy of the
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